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James R. Killian, Jr.:
Don't Sell Our Private Colleges Short



Technology Review

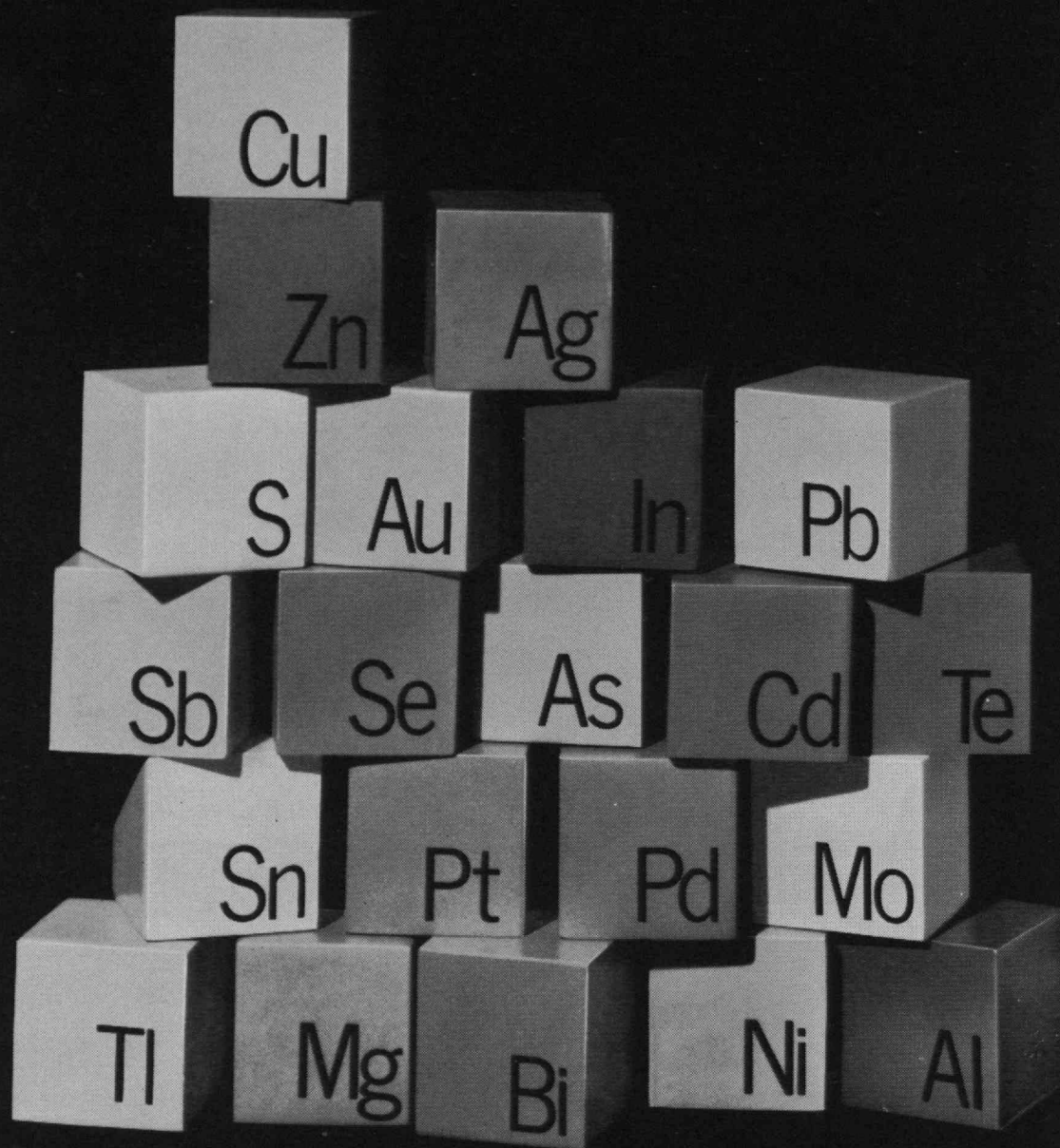
Richard J. Wurtman:
Biologic Rhythms in the Body



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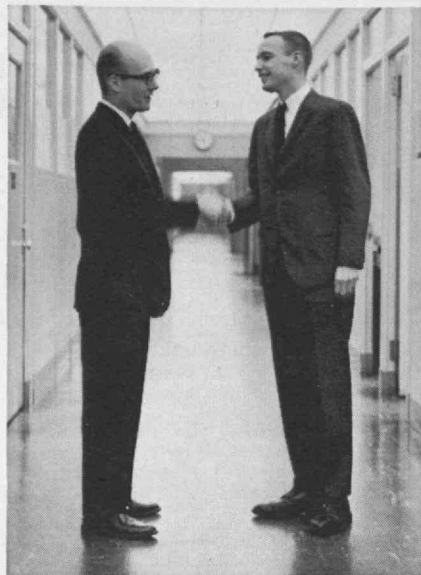




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John C. Heiman,
a typical Kodak
industrial engineer ▶

◀ Elwood R. Noxon,
a typical Kodak
industrial engineer

What was crucial six months ago? Hard to remember.

Six months is a long time to a Kodak industrial engineer. Much happens. Men like these carry on as if the whole company—top to bottom and stem to stern, cameras to industrial adhesives, food emulsifiers to check microfilmmers—were a big laboratory for the practice of industrial engineering under the best of conditions. Management finds it pays to let them think so. Happy, they make their advance as strictly professional industrial engineers or hide their industrial engineer's insignia and use their skills to take over other functions in the organization.

Apart from the common denominator of an employer that appreciates industrial engineers and can always use more of them than we get, Heiman and Noxon lead very different working lives. Without assuring these gentlemen against the possibility that six months hence they will have traded specialties, here's the contrast:

Heiman is an accomplished simulation man, a thinker in Fortran, a builder of models for the big computer to manipulate.

He made a good score lately when given six weeks to overhaul the reasoning behind the design of a chemical manufacturing system that had evolved over the last five years as a multi-channel processing plant with problems in line interference and flexibility. He and a colleague, checking each other, spent three weeks writing a program that covered building size, reactor size, product flow, and auxiliary equipment. Debugging took another three weeks. All the while a third man was collecting experience data from the old production area.

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Noxon works on mechanical goods. He pities industrial engineers who don't get to collaborate with their mechanical engineer partners right from when a project still consists of only rough sketches. He does get called into his projects that early.

His place is in the middle. At his extreme left is the design engineer who created the product idea. Next sits the manufacturing engineer, devising ways for the production boss to transform the idea into reality at the required volume. To the quality-control engineer at the other end of the table is entrusted the whole reputation of the company as it rides on the proposed new product. Between him and Noxon, the production boss awaits instructions. Noxon's job is to sell cost awareness right and left. Unless each of the five gets in his licks, there will be trouble.

Noxon can't stay in the conference room all day. The action is on the factory floor. In putting together job designs, learning curves, and space requirements for the 1970 line, he cannot ignore the ongoing commitment to 1969 product and the lively remnant of '68 production. And cost reductions had better continue when Noxon and his teammates study the "audit assembly" movies from initial production.

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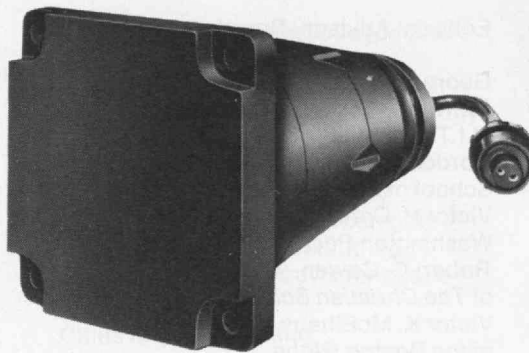
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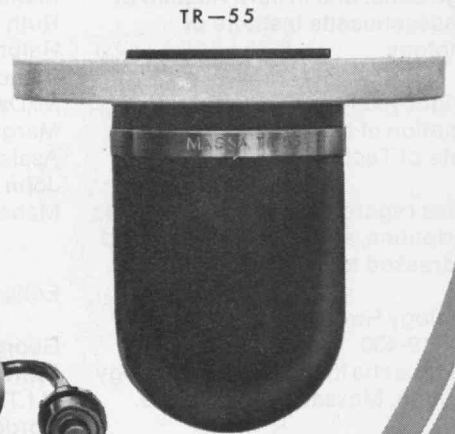
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Next month

Two years ago, in Technology Review for April, 1966, Warren G. Bennis, Ph.D. '55, forecast the rise of new social and industrial systems suited to the Twentieth Century needs. Next month Dr. Bennis returns with a sequel—an important essay on the qualifications for leadership in the adaptive, rapidly changing organizations of the future.

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Science's Place in the Political Spectrum

If Eugene B. Skolnikoff, '49, Associate Professor of Political Science at M.I.T., has his way, upcoming generations of graduates of institutions of higher learning will be able better than their predecessors to assess the merits of proposed technological enterprises. This seems likely because Dr. Skolnikoff is persuasive, discerning, industrious, and gifted with qualities of leadership. He will, of course, have a lot of help from his teaching colleagues in other universities and colleges, many of whom are quite as keen as he to improve the political relationships of technology. He will, as well, have a lot of support from future-facing legislators like Representative Emilio Q. Daddario of Connecticut (see *Technology Review*, Dec., 1967, p. 15) who is diligently seeking for Congress a better technology assessment capability. This kind of commitment to improving the interplay between natural and social scientists in the interests of the whole policy came into shining public view at the 1967 annual meeting of the American Association for the Advancement of Science in New York City.

Because he is Secretary to the A.A.A.S. Section on Social and Economic Sciences, Professor Skolnikoff was essentially responsible for putting together the program of the Section for the annual meeting. The result was a sparkling program, to which this report will do disservice by confining itself to observations about some fairly blunt, take-it-or-leave-it remarks by Herbert Roback of the staff of the Subcommittee on Military Operations, Committee on Government Operations, U.S. House of Representatives, in his talk on "The Role of Congress" in the program arranged by Charles V. Kidd of the Federal Council for Science and Technology on Science and Technology as Instruments of Policy; and a recapitulation of the unstructured Workshop on Science and Public Policy convened by Dr. Skolnikoff himself.

The Status Quo

Not in so many words, certainly, but in substance, Roback said: Here is the way Congress is organized; here's how bills go through Congress; here's how its several committees are organized and

function; we've already too many experts telling us what to do without adding more; we look at things from an executive-agency rather than a subject-matter viewpoint; members do a good job evaluating agency requests for funds because for years they have been assigned responsibility for those agencies; we suspect that most budget requests are padded; this is the way we do business; I doubt that you can change our methods.

What is so dismal about the Roback presentation is that its thesis is probably incontrovertible. The frightening thing is its arrogant complacency. In a time of dynamic progress in operations research and systems analysis, Roback galumphs down the bright, new boulevard in a Congressional horse-and-buggy creaking with unwillingness to overcome its self-imposed inadequacies. Bills, he said, that obviously should be assigned to certain House committees wind up in others, and when they reach the Senate they find their way into still other committees with jurisdiction over quite different substance. But, ho-hum and by-gum, that's the way we've been doing it, and that's the way we will go on doing it. Members become identified with a particular agency and its program—the late John Fogarty of Rhode Island, the late Albert Thomas of Texas, Senator Lister Hill of Alabama and others—because no matter how deep the old buggy digs its ruts, that's the way good things get done—good things, possibly, like the recent over-appropriation of funds to the embarrassment of recipient National Institutes of Health, which could not use all the money it received, largely because few dared challenge these entrenched patrons! Or good things, possibly, like the supersonic transport hang-up! Assuredly, Roback knows all about Daddario's efforts to help Congress obtain a better technology-assessment capability—but we've got too many experts telling us how to run our business without adding more. Listening to Roback's discursive (I timed it at 52 minutes) defense of things past was a disintegrative experience in futility.

If Congress ever does establish some kind of mechanism to sharpen its analytical capability for assessing proposed

technological undertakings, it seems clear, in the light of his presentation, that little help can be expected from the Roback camp. Having worked four years as the Administrative Assistant to a U.S. Senator, this writer knows that Congress needs such capability. It will be found, I believe, in the young men and women now being trained in several graduate and undergraduate departments of farsighted colleges and universities across the nation under the skillful tutelage of resolute teachers like Dr. Skolnikoff.

Arise the Social Scientists

Some 200 of those teachers met together with their colleagues from government and industry in a kind of colloquium that was refreshingly different from most A.A.A.S. meetings. Nearly all discussion developed from the floor, not from the platform, in a lively three-hour, sharing experience. Before it ended, most walls separating staked-out empires of scientific disciplines tumbled down, and in the rubble one easily saw taking shape the pattern of a new structure, comfortably accommodating both natural and social scientists and designed better to serve the public good.

The walls didn't fall of their own ponderous weight, to be sure, because when Curtis Williams of Rockefeller University opened the meeting by suggesting that the "bench scientist" must provide the thrust for the science-public policy effort, the social scientists, sensing that their role was about to be subordinated, raised voices of dissent. Opposition was blunted, however, as Dr. Williams' position was sharpened in exposition: "Don't ask an organic chemist to 'do something about pollution'; translate your needs into his language; get at him through his particular interests; ask him to bring his expertise out of the lab in the interests, for example, of smoke abatement." Quickly, James McCamy of Wisconsin's Department of Political Science agreed: "Environment is too broad . . . we must focus clearly on a specific problem, then draw on both natural and social scientists for its resolution." Mason Willich of Virginia's School of Law, Lynton Caldwell of Indiana's Department of Government, and Donald Kash of Purdue's Department

of Political Science supported him—and the walls began to cave in.

Demand for Educational Development

Another facet of the science-public policy dialogue—curriculum development—was explored when Dr. Skolnikoff asked Joel Snow of the Center for Advanced Study at the University of Illinois to summarize a recently held Illinois symposium supported by a grant from the National Science Foundation. Snow reported that the symposium proposed three types of courses: (1) a general course designed to convey the impact of science and technology on society to be offered to all undergraduates; (2) a course with advanced honors for bright students; and (3) a course for faculty to help overcome “fixed attitudinal positions” commonly held by a “surprising” number of teachers. Christopher Wright of Columbia’s Institute for the Study of Science in Human Affairs described Columbia’s methods; Emmanuel Mesthene of Harvard’s Program on Technology and Society told what Harvard is doing; and Dr. Skolnikoff outlined the way M.I.T. manages its effort.

Careers for graduates with major emphasis in science-public policy courses—the final general topic considered by the group—seemed to be available in increasing numbers. Brewster Denny of the Graduate School of Public Affairs at the University of Washington reported on programs developed jointly by the U.S. Civil Service Commission and the Council on Graduate Education in Public Administration. Others voiced opinions that the market for trained persons is expanding. Dr. Skolnikoff’s commitment was further expressed in two publications prepared for the occasion under his direction, copies of which were given each participant—a listing of colleges and universities which now offer courses in science and public policy, and associated faculty; and an introductory bibliography compiled by Harvey M. Sapolsky and Daniel Rich of M.I.T.’s Department of Political Science.

The applause for Dr. Skolnikoff for convening and directing the session was long and genuine. Indeed, the session



may have been *too* productive for Professor Skolnikoff—the group directed him to set up a committee to explore the viability and wisdom of establishing within a professional organization—the National Academy of Sciences, the A.A.A.S., the Social Science Research Council, or others—a science-and-technology-studies section or council to provide for the further development of programs in science and public policy.

Eugene B. Skolnikoff’s ‘49 role as mediator of the political implications of modern science was typified at the Robert S. Williams Lectures at M.I.T. this fall, when he (right center, above) was chairman of a panel discussion including Gordon S. Brown, ‘31 (left), Dean of the School of Engineering, J. Herbert Hollomon, ‘40, President-Elect of the University of Oklahoma; and Jerome B. Wiesner, Provost of M.I.T. (right). Dr. Skolnikoff, who is Associate Professor of Political Science, is in charge of the Institute’s academic programs in science and public policy.

Clyde C. Hall was Public Information Officer of the National Science Foundation from 1956 to 1964; he is now a freelance writer and occasional contributor to *Technology Review*.

A Vote for Reliability

If Bob McNamara gets tired of the World Bank, maybe he could get a job as consultant to consumers. Certainly I could use some Pentagon tough-mindedness when shopping for a new toaster or TV set.

Military and space agency buyers know how to get what they want in hardware. And they want some of the same things I do, like reliability—meaning, the gismo works when I get it home and goes on working for a satisfactorily long life. It's time the consumer demanded, and got, the quality in products and service the United States government expects.

It was gratifying to hear some of the leading practitioners of reliability engineering take this line when they met in Boston for the 14th Annual Symposium on Reliability. Symposium General Chairman Harry Reese of the General Electric Company remarked in conversation that consumer products undoubtedly are better than ever. They're more complex, too. And, mass production being what it is, they often let the buyer down. It's not enough to have a better mouse trap, he observed. You want one that snaps when the mouse grabs the cheese and that goes on snapping for a reasonable working life.

Quality versus Price

One of America's most sophisticated buyers, Lt. General William B. Bunker, S.M.'37, thinks the consumer's plight enough of a challenge to call forth a national response. He urged a quality control program as intensive as that of the military to put reliability into consumer products. As Deputy Commanding General of the Army Materiel Command, he backs up his bucks with in-depth appraisals of computer-aided analysts. His outline of the steely minded techniques with which he gets his money's worth made shopping for discounts look like a mug's game.

Consider "life-cycle costing." That means, when a supplier quotes a price, the Pentagon figures in the lifetime running costs as well. Looking at prices that way helps the Army get the best over-all bargains. Consumers could

profit from this kind of thinking and so could the national economy.

General Bunker told the symposium: "I think you will have to admit that at least 5 per cent of our production, civil and military, today suffers from quality defects. I'm including here the refrigerators, TV sets and automobiles with the tanks and aircraft of the D.O.D. and the space equipment of N.A.S.A.

"If then we could reduce these defects by one-quarter by better control of our reliability programs in design, in manufacturing, and in-service, we would . . . eliminate billions of dollars of waste in our national economy. . . . I'd like to see a formal program like the D.O.D. Cost Reduction Program to accept this challenge and see what would happen."

Consumers, Mr. Reese said, ought to build up public pressure to get at least elements of this kind of program going. People, he noted, tend to buy by price rather than looking for quality. And that can lead to expensive mistakes if the cheap product won't do the job. We need a desire for quality and public pressure to get it at a reasonable price.

Mr. Reese thinks you could build that pressure through protests. "If something doesn't work right or you don't get the service you should—protest," he said. "Product quality pretty accurately reflects the market, what people will buy, what they protest about."

The Real Meaning of Reliability

George E. Kelm of the American Telephone and Telegraph Company's Automotive Group must have known what the chairman had in mind, for he lit into Detroit for its quality control. "Reliability to the Bell System," he said, "means real effort to reduce failures in our equipment and communications network . . . We would like the same from the automobile industry."

With a fleet of 123,000 motor vehicles and an annual shopping list for 18,000 new cars and trucks, Mr. Kelm based his criticism on experience. Referring to a selection of reports on new deliveries,

he said, "Over 80 per cent of some 1,225 vehicles that were inspected had one or more defects. By defect, I mean anything that requires dealer or factory attention to correct."

"Maybe this is 'pie in the sky,'" he quipped, "but quality or a 'finished' product is not the new vehicle that quits on the road home from the dealer or the vehicle whose steering wheel nut is missing or loose."

For the auto-maker's part, J. Knowles of Ford Motor Company noted the great strides in performance and general quality the industry has made over the past decade. Director of the Technical Analysis Office in Ford's Engineering Staff, he pointed out "the impossibility of achieving 100 per cent reliability by any manufacturer that turns out several million units of a complex product, containing 15,000 components each, many of which are moving parts, and subjected to an extraordinary range of use and abuse during the vehicle's lifetime."

To Mr. Knowles, "an obvious indicator of improved reliability is the industry's extended warranties." He said that Ford's basic warranties "have increased 600 per cent in mileage and 800 per cent in time since 1960."

Government and Public Pressure

Certainly, Detroit does have a much better-designed product now than, say, 20 years ago, in many respects. We would probably all admit that. Mr. Kelm acknowledged it several times. But he went on to point out, "The automobile industry does a magnificent job . . . but then proceeds to deliver through its dealers . . . a product that leaves much to be desired." And that is the basic point. Sloppy assembly all too often negates the solid engineering that lies behind today's new cars.

"The extended warranty of the manufacturer reposing in the glove compartment is small comfort when the car fails in the middle of a four-lane, high-speed highway or late at night . . ." Mr. Kelm observed. The editor of this magazine and I know what he means.

His comment recalls the night last fall when we almost didn't make it home from an M.I.T. function because the torque converter in the automatic transmission of my "new" car failed at 10,000 miles.

The dealer had already found a cracked manifold in that car. When I turned it in after the transmission failure, he commented, "We might have expected it. Cars from that particular assembly plant are always badly put together."

Mr. Kelm explained that "there's no quick and easy solution" to this problem of quality control in automotive mass assembly. "I can outline the problem," he said, "but not solve it except to suggest that the factories make facilities available at the end of their lines similar to those now widely installed in [car] diagnostic centers. Here, the vehicle can be put through its paces under road load conditions . . ."

Mr. Kelm did have the grace to acknowledge that, at times, his own company's performance leaves something to be desired. "More than once," he said, "have I had the wind taken out of my sails . . . when the fellow at the end of the line said, 'Speak louder, I can hardly hear you.' " However, he told Detroit, "We are trying hard to make those telephones work. Please do the same for our vehicles."

Perhaps the difference is that Mr. Kelm's company has the Federal Communications Commission on its back. If I don't like the telephone service, I can appeal to this regulatory body. Detroit only now is beginning to feel public pressure expressed through government regulation.

And that's Harry Reese's point. "When a company gets a raft of letters, or otherwise feels public pressure—it moves," he said. "I think that this business of product reliability is like politics. Your letter of protest is one vote. You can ask, 'What good is my one vote?' But if people think that way, democracy breaks down."

Do makers of flat irons and washing machines really pay that much at-

tention to their mail? I buttonholed T. A. Daly of Westinghouse Electric Company and asked him. As Director of Reliability in the corporate headquarters' Engineering Section, he has an overview of the subject. He said that his company, at least, feels its business future rests on paying strict attention to consumer satisfaction.

"You can advertise all you want," he explained, "but the real corporate image is created by how products you put out perform for people." Westinghouse, he said, realized this some years ago and, in 1963, started a corporate-wide reliability program to do something about it.

Are Products Really Better?

Are consumer products really working better these days, or do they break down more often, which is the impression you sometimes get?

"I think, in general, industry as a whole is producing an upsurge in quality," Mr. Daly replied. "I wouldn't go along with the statement that consumer items break down more often. The converse is true. But servicing is getting harder. And the products are getting more complex. At the same time, we have lost the individual craftsmanship of labor. These factors make it very hard to maintain quality control in manufacturing. We need to get a strong handle on this.

"What you can do, and what we've done, is to get manufacturing and inspection procedures tied down. Then we try to design reliability into the product. You've got to get this reliability into the basic design if you're going to lick the quality control problem."

That is where consumer reaction comes in. Mr. Daly said that dealer service slips and consumers' letters are studied closely. Specific defects they outline are coded for computer analysis. In this way, design engineers can spot defect trends, pin down troublesome design elements and eliminate them.

"Over the past five years," he said, "we have very definitely seen an

increase in reliability in our products across the board. We can estimate this from evaluations such as those of *Consumers' Research*. Another measure is cost of repairs under product warranties. We have seen a marked decrease in that."

Is there anything a buyer can look for other than brand names as a general guide to product reliability?

"That's a tough one to answer," Mr. Daly observed and, in effect, answered "no." "It comes back to creating and maintaining a company's reputation for reliability," he said. "It's really the company's reputation you go on."

So, perhaps Harry Reese is right. Short of plugging into the Pentagon cost-analysis system, maybe the way to lick the reliability problem is to let the maker know what you think. The next time your new TV set conks out, invest in a six-cent postage stamp and register a vote for reliability.

Robert C. Cowen, '49, is Science Editor of *The Christian Science Monitor* and President of the National Association of Science Writers.

Autobiography: Here Am I

When in the fullness of maturity, after accumulated years have put an end to action, Winston Churchill is inspired to write an account of the changes he has wrought in the world; when Bertrand Russell is moved to map the roads he has followed in enlarging human knowledge; when Casanova boasts with innocent pride of surpassing previously unimagined limits—we understand readily why they address us and what they are saying. "Here," they tell us, each in his own way, "Here is what I have accomplished."

But how are we to understand an autobiography, *Making It* (New York: Random House, \$6.95) by Norman Podhoretz, a venerable elder of 38? Or another, *North Toward Home* (Boston: Houghton Mifflin, \$5.95) by Willie Morris, five years younger? Or *Stop-time* (New York: Viking, \$5.95) by Frank Conroy, not yet 32? What do they mean to tell us?

There are resemblances other than the authors' youth. All three are writers, although Mr. Conroy's book is his first. Two are in charge of leading periodicals. At the age of 30, Mr. Podhoretz was appointed editor of *Commentary*, published by the American Jewish Committee, a magazine that is far from parochial, taking almost all contemporary issues within its province. Last year, at 32, Mr. Morris became editor-in-chief of *Harper's*. Mr. Podhoretz spent several years on a fellowship at Cambridge, Mr. Morris was a Rhodes Scholar at Oxford, and Mr. Conroy lived for a time in London. If their paths crossed in England or in New York, where all three have worked, none mentions the fact.

From Texas to New York

Mr. Morris starts his story in Yazoo City, Miss., population 7,000. His boyhood was a tranquil Southern stereotype that ended abruptly when he went to the University of Texas in Austin. Here he discovered not only that Yazoo City was a small town, but also the existence of books and ideas. By his senior year, as editor of the student newspaper, he was involved in statewide controversies over political interference in the University, academic freedom, and the influence of the oil lobby.

After four years at Oxford, he resumed the critic's role, becoming editor of a liberal weekly, *The Texas Observer*. In a tradition as old as the muckraking days of Lincoln Steffens, he attacked the crooked, cynical politicians of the state legislature but found many of them more likable than their moral betters. He came to know, and be known by, every important political leader in the state, including Senator Lyndon Johnson, who later said, "Those *Observer* boys were never kind to me."

When Texas shrank in his eyes to life-sized proportions, or smaller, Mr. Morris was ready for New York. Although he disliked living in the city, he was fascinated by the intellectual life that flowed around him as an editor on the staff of *Harper's*. His book and his journey end as the plane, on which he is returning with his young son from a visit to Yazoo, circles over the city, "over the landmarks of my past, and my people's. Then, slowly, with a lifting heavy as steel, it circled once more, and turned north toward home."

A Shorter Journey

The journey that Mr. Podhoretz made, from Brooklyn across the river to Manhattan, was shorter in actual, though not in cultural, distance. Born to immigrant Jewish parents, he did not have to discover books and ideas; they were there. He learned to use them long before he learned they could also be enjoyed. A high school teacher, childless herself, pushed and bullied him, despising his speech, his clothes, his manners, but recognizing his talents which eventually won him a Pulitzer scholarship to Columbia University. When he returned from Cambridge, a disciple of the awesome literary critic, F. R. Leavis, he hovered about the edges of the Intellectual Establishment, gradually moving from the outskirts to his present central location.

Mr. Podhoretz claims, indeed, that his book is about his discovery of the importance and pleasures of having power, money and fame, of how he achieved them, and—in a surprisingly Victorian vein—of the "prices to be paid for the rewards of making it in America." As Mr. Podhoretz de-

scribes how he made it, both the pleasures and the price seem to be rather moderate. This is not entirely surprising, since the money is not in the realm of the very rich, the power is at most sufficient to make reputations, not revolutions, and the fame is in the eyes of a relatively small group.

Throughout the book, Mr. Podhoretz never has less than one eye on this group, the Intellectual Establishment, but perhaps not for the obvious reason. He is so self-consciously aware of being daring, his tone is sometimes so cutely mischievous—can he be putting on his confreres, as the seniors among them once baited the *bourgeoisie*? Here are the last two sentences in his book: "Writing a book like that [about success, which has replaced sex as the dirty little secret] would be a very dangerous thing to do, but some day, I told myself, I would like to try doing it. I just have."

Immediately following is a four-page index, consisting only of names—from Abel, Lionel, to Yeats, William Butler. This is name-dropping on a grand scale, but the most fun comes from seeing whom he has omitted.

Attachment, not Subject

Frank Conroy traveled a different road. The places in which he lived between the ages of 11 and 20—New York City where he was born . . . a brutal boarding school in Pennsylvania . . . backwoods Florida, with his mother and stepfather . . . a strangely permissive Folk High School in Denmark, where his mother's people were . . . Paris, for a little while . . . and finally Haverford College—these are not the important places in his life. His real journey was defined by interior signposts that marked his emergence from the helplessness of childhood to the first stages of self-sufficiency.

The story ends as he is welcomed to Haverford by a student, but it is bracketed by a prologue and an epilogue, set 10 years later in England, when he is writing his book. And the epilogue has its own cryptic closing, after Mr. Conroy, half drunk, has narrowly avoided crashing his car in a village square:

"A window was raised, and after a moment a man's voice called out. 'Here. What's all this?' My throat burning with bile, I started to laugh."

With his lean style that heightens emotion by compression, Mr. Conroy's book is the most novelistic of the three. But all exhibit the same tendency, which is evident, for example, in the detailed and knowledgeable accounts of Texas politics or the literary-intellectual milieu, each of which somehow appears to be freefloating and somehow illuminates not the ostensible subject but the single point of attachment—the author.

The Journey toward Awareness

By this route, we have returned to the question—what do the authors mean to tell us? Clearly they are not concerned with dates and places, with biographical facts and sequences of events in the Churchillian manner. On a scale from fiction at one end to history at the other, their approach is closer to the former than to the latter. This does not imply a lesser degree of truth, rather an attempt at self-portraiture in other terms.

When a voice calls, as to Adam in the Garden of Eden, to Abraham in the land of the Philistines, to Moses out of the burning bush, a man can hide or he can answer in their words, "Here am I." In this response to an inner voice, a response that may be private or public, lies the origin of another kind of autobiography. In the implicit double sense of what and where, the ancient, formal words acknowledge the challenge of two questions—who am I and what is my place in the world?—and provide the framework for an answer.

Such autobiography, personal rather than historical, must be written before the onset of advanced maturity. When it is well written, the author is talking as much to himself as to the reader, who is permitted to eavesdrop on the journey toward awareness.

In Brief

It would be difficult to name a man who has been more influential than

Edmund Wilson in shaping the taste and judgment of many of those in the literary-intellectual establishment described by Mr. Podhoretz. In addition, he has provided pleasure and guidance to a generation of readers whose relation to books is nonprofessional. In *A Prelude* (New York: Farrar, Straus and Giroux, \$6.50), Mr. Wilson has collected some early notes and journals covering largely his college years and World War I army service. This is a minor work, but interesting in terms of his later development as a writer.

The Shores of Light (New York: Noonday, paper, \$2.95) is a re-issue of one of Mr. Wilson's major collections. Subtitled "A Literary Chronicle of the 1920's and 1930's," it contains critiques of the new writers of the times—Eugene O'Neill, F. Scott Fitzgerald, Gertrude Stein, Ernest Hemingway, and many others—that should be, and are being, read today, as well as essays on such social phenomena as burlesque, Greenwich Village, and Houdini the magician.

New from the M.I.T. Community

Fundamentals of Applied Probability Theory, Alvin W. Drake, '57, Associate Professor of Electrical Engineering. New York: McGraw-Hill Book Co., \$9.75. A textbook intended for a one-semester first course with a pre-requisite of elementary calculus through integration in several dimensions, including Markov processes and introductory statistics and emphasizing sample space formulation of probabilistic situations.

Biochemistry of Some Foodborne Microbial Toxins, Richard I. Mateles, '56, Associate Professor of Biochemical Engineering, and Gerald N. Wogan, Associate Professor of Food Toxicology. Cambridge and London: M.I.T. Press, \$7.50. Ten papers presented at the Symposium of Microbial Toxins held during the meeting of the American Chemical Society in September, 1966, with a preface by John T. R. Nickerson, '32, Professor of Food Technology.

Population Processes in Social Systems, James M. Beshers, Associate Professor of Sociology. New York: The Free

Press. A college-level textbook on population theory, historical trends, current population data, and future prospects—using the methodology of modern social psychology to examine migration, mortality, and birth-control technology. There is special emphasis on the effects of population dynamics on social processes.

Fresh Water from Salty Seas, David O. Woodbury, '21. New York: Dodd, Mead and Company, \$3.50. The story of water desalination in layman's terms: how it can be done, what has been accomplished to date, and what are the future prospects, written especially for high-school-age readers.

Handbook of Electronic Instruments and Measurement Techniques, Harry E. Thomas, S.M.'25, and Carole A. Clarke, '21. Englewood Cliffs, N. J.: Prentice-Hall Inc., \$12. A comprehensive handbook of physical and electronic instrument characteristics, including measurement procedures and techniques.

The Financing of Small Business: A Current Assessment, Irving Pfeffer, Editor. New York: The Macmillan Company. Studies by 18 contributors of the financial problems of small business, including one chapter by Donald H. Woods, S.M.'59, Professor of Finance at the University of California (Los Angeles), on the economic role of Small Business Investment Companies established by Congress under the S.B.I.C. Act.

Joseph Mindel is a member of the M.I.T. Lincoln Laboratory. He was formerly a teacher, department head, and administrator of science education in the New York City secondary schools. He has written on science education and the history of science and is the author of many radio and television plays. The notes "New from the M.I.T. Community" have been prepared by the editors of *Technology Review*.



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Pessimism for the future of independent higher education is a serious misreading of the universities' capacity for management and of America's capacity for support

James R. Killian, Jr., '26

Don't Sell Our Private Colleges Short

Many recent statements about the financial outlook of our private educational institutions have been notable for their sense of pessimism and defeatism. Having been involved for nearly three decades in the financing of M.I.T., I am well aware of the difficulties of finding resources and have a well-honed sense of the urgencies that invest the current status of these key institutions. However, I believe that the situation is less disastrous than the prophets of doom suggest.

I also submit that recent, sweeping critical statements by a variety of voices on the management and planning of colleges have not distinguished adequately between the many institutions that are well-managed and those which are not. Our well-managed private institutions need to mobilize their own voices to stress their strengths and their realistic appraisal of their forward needs and the outlook for meeting them. They also need to campaign more effectively than they have so far to win a better understanding in the Executive Branch and in Congress of the way in which federal funds and policies can help private institutions.

Part of the present problem confronting private colleges in obtaining adequate funds lies in two contradictory but widely held attitudes that are injurious to the health of private higher education and which, if uncorrected, will act as serious impediments to all of higher education.

Two Hurtful Attitudes

The first of these is the mistaken assumption that the great growth of federal support of education, and especially of university research in science and engineering, has lessened the need for private support, or presumes that all private institutions must in the end lose their private identity and become indistinguishable from public institutions because of the failure of private support.

American higher education is unique in the diversity of its institutions. Total reliance on the federal government would inevitably give higher education,

in the words of one observer, "a sturdy gray color and quality that would be at best wholesome and unexciting." Such a monolithic system would more likely be excessively rigid and restrictive. To maintain our diversity and to sustain its strengths will require in the future, as in the past, a comparable diversity in the sources of support, public as well as private.

The second hurtful attitude I have already mentioned—a spreading feeling of defeatism about the future viability of private education. I am disturbed both by those who are apathetic and by those who are reaching for the panic button. I do not minimize the challenge we face in financing our private institutions, but I am not defeatist. A spate of articles in the national press has indicated that the gap between the needs and the income of our private institutions will continue to grow and that private higher education may become, as an article in the October, 1967, issue of *Fortune* suggests, "economically unsustainable." I reject any such suggestion as a serious misreading of the capacity of our strong private institutions to keep themselves solvent and the willingness of private philanthropy jointly with government to provide the necessary support, particularly of the kind which conserves or assists the core strength of the institution—that strength from which the whole enterprise derives its well-being. I also believe that the private institutions must not let the misapprehension spread that they are unsustainable as independent institutions.

In part, the current discussion about the plight of the private institutions results from the improved forward planning of our leading institutions. They now know better what their funding requirements will be, and they are forcefully displaying to the public considered and solid estimates. If the totals seem startling or alarming, they represent for the first time a prudent, realistic look at the facts. M.I.T. has summed up its capital needs (apart from current needs) during the next decade with a total figure of \$135 million. It also seeks

to increase its endowment funds to at least \$500 million, an increase of about \$175 million. That this figure is not unrealistic is indicated by the fact that over 75 per cent of our current invested funds have been received since 1950.

The statements also reflect the sound budgetary management that prevails in our leading institutions. For a number of years M.I.T. has made operating budget projections for three or five years ahead. The cost of excellence is steadily rising, and the leading institutions are declaring their determination to fund it. They are also making clear their tuition bind; as the private institutions are forced to raise their tuition to balance their budgets, they know that across the street are the public institutions with low tuition, or none at all. The capacity of the private institutions to attract adequately off-setting student aid and to continue as pace-setters becomes a requirement of basic importance.

I have a conviction that if we could make an estimate of these central needs of our private institutions, we would find the total amount of money required to be a manageable total in relation to the potentiality of sources of funds. I am convinced, too, that the time has come for the sources of really large private funds—individuals, corporations, and foundations—to reconsider their policies in making grants. In their lists of priorities they need to recognize the importance of supporting the core needs of institutions as well as the importance of new or peripheral programs, and that, at this time, the overriding need may well be not for many scattered small grants but for bold consolidated large grants that will have a major impact in creating or stabilizing our centers of excellence and enabling them to make quantum jumps in strength and quality. In their present preoccupation with finding new and innovative programs to support, grantors of funds may wind up supporting side shows while the main tent is falling down.

Faltering Federal Funds

In recent years the flow of federal dollars to the country's educational institutions has grown in strength and volume and has lifted these institutions to new levels of strength and achievement. Over the past 15 years, this support has been absolutely essential for American higher education to meet the new demands that have been placed upon it during this period.

For the most part, this federal aid has been managed both wisely and well, and has been given in ways designed to preserve the freedom of our educational institutions and to minimize the threat of federal control. However, this is not to say that federal support has not presented us with very difficult problems and issues, or that the relation-

ship with the federal government may not deteriorate. In fact a number of current trends are giving profound trouble to the universities. The time is now more than ripe for enlarging national clarification of the form and meaning of the partnership that has evolved and on ways to resist a degradation in relationship.

One possible harmful aspect of federal funding policy is the growing emphasis on applied research and on the need to achieve quick, practical results. As a recent editorial in the *New York Times* put it: "The long honeymoon enjoyed by basic research in the nation's universities and other laboratories appears to be coming to an end. In both the White House and Congress more and more impatience is being exhibited toward research inspired by scientific curiosity rather than by the desire to solve specific and well-defined immediate problems."

Basic science is not the icing on our technological cake but an essential ingredient in the mix. American science today is flourishing, and we should do nothing to blight its bloom. In fact, I believe that we may be only at the beginning of unexampled scientific and engineering achievement, especially in the life sciences and in environmental technology. With the future so promising, now is not the time to relax our scientific effort or to talk timidly about having reached some kind of ceiling in our upsurge of scientific and technological productivity. At this juncture the role of the federal government is crucial. What policies it follows in support and encouragement can largely determine whether our progress is retarded or advanced. I cannot emphasize too strongly that it is wrong and shortsighted to conclude that cutting R&D is a painless way to cut budgets. It may be the most damaging of all ways. If federal expenditures are to be curtailed, R&D budgets should take their proper share of cuts, but they should not be sliced indiscriminately or in ways that disrupt good programs or seriously hurt institutions.

The report of the Physics Survey Committee of the National Academy of Sciences recommended new levels of basic research in this field and advised that: "The nation should understand the risks of failure to achieve the recommended level of physics activity; the nation jeopardizes its present world leadership in physics; it risks having an enlarged college and university system relatively weaker in the basic physical science upon which engineering, the earth sciences and the life and medical sciences rely for underlying principles and for innovations in instrumentation and techniques; it risks accentuated shortages of physicists in industry, government, and education; it risks a cor-

responding future lag in technological and economic growth." Many of the same arguments could be made for other fields of science and for research in engineering.

In the two decades since the end of World War II, support of research and development by the federal government has grown spectacularly, to a total of nearly \$17 billion a year, about \$1.4 billion of which goes to American colleges and universities. Because of obvious limits on both the dollars and the manpower required, the average rate of growth of these years clearly could not be continued, even without the current cost-cutting pressures in Washington. But if we are to increase our output of doctorates in science and engineering, as all informed judgment indicates we should, basic research should not be seriously cut back even in the short term because of its interrelation with graduate education. The maintenance and strengthening of this interrelationship should be a firm policy of the federal government.

Unfortunately, not only has over-all support of research in the physical sciences been cut, but there has been a drastic reduction in authorizations for graduate fellowships and traineeships in the physical sciences. This double-edged squeeze on the support, both direct and indirect, of graduate education is compounded by the steady growth of graduate school enrollments and the continuing increase because of inflation and other factors in the cost of graduate education and of academic research.

We should strive to reverse this retreat in the support of graduate education and research. Our nation's academic programs are strong, but may not be as strong tomorrow as they appear today. We hear sometimes that we are overemphasizing science, but every recent manpower study has concluded that we need to increase the number of students studying science and technology, particularly those studying for doctorates in science, engineering, and mathematics. The demand will continue to grow and will be accelerated by the rising interest in a number of scientific fields, and, among our young people, in the great urban and public problems of our day—the problems of transportation, pollution, water resources, and the like.

Red Tape and Rising Costs

I wish to discuss next the problem that Dael Wolfle has identified as that of "control by accountants." Over two years ago the government, after a period of skillfully handled relationships, was showing signs of increasing insistence on cost accounting procedures and controls of a kind more appropriate for the procurement of matériel than for the conduct

of university research. There is widespread evidence today that some of our institutions are becoming mired in "morasses of red tape," to use the phrase of Washington University Provost George Pake.

These restrictions and controls, which almost never concern themselves with quality, can damage the very assets that make our universities the most effective centers for basic research. Our colleges and universities must, of course, be meticulously responsible in handling public funds; but they cannot let themselves be treated as factories without severe damage.

Another troublesome aspect of federal funding is the relatively new policy called cost-sharing. This policy requires every institution receiving a federal research grant (not a contract) to share in the support of that grant in more than a token amount. Currently, the various federal agencies have different regulations on how cost-sharing is applied, and different interpretations of a token amount. At M.I.T., and presumably at other institutions, our share has generally ranged from 3 to 5 per cent with most agencies. With the National Science Foundation, however, our cost-sharing has been running at a rate of about 8 per cent. Another form of cost-sharing is the requirement of the National Science Foundation that not more than 50 per cent of the salary of a staff member can be charged to a grant.

If cost-sharing must be applied, despite its problems, then the interests of equity demand a reasonably uniform rate. Further, it would be particularly helpful if throughout the federal establishment cost-sharing were applied on an institution-wide basis rather than project-by-project.

The financial burden of cost-sharing is heavy. M.I.T., for example, contributed through cost-sharing and unrecovered overhead last year about \$1.3 million to the costs of sponsored research. Despite the obvious benefits of support for research, we had to face the problem of finding this \$1.3 million—a substantial sum for any university. Clearly, the federal government could give substantial help to higher education by paying the full cost of this research, thus freeing the institutions' own funds for other purposes—perhaps those for which federal support is not available. I believe categorically that the federal government should pay the full cost of the research it sponsors in the universities.

My last concern relating to federal support arises from the fact that the federal involvement in university research has become so large that changes in national policy on research can have

massive effects on the whole of our educational establishment. Obviously no government will suddenly withdraw all its support from colleges and universities. But at a small college the termination of even a single large grant can produce a shock wave throughout the institution, while the inflow of new grants can create problems because of the cost-sharing requirement. And reductions in fellowships and in research support have a baleful impact on the whole of our educational enterprise and on our national goals.

One other recent shift in federal policy has large-scale effects, particularly on institutions such as M.I.T. In accordance with a Presidential memorandum, the government now requires federal agencies and departments with major research responsibilities to re-examine their support policies to help additional institutions to become effective centers for teaching and research. There has also been increasing pressure in the Congress for the various federal agencies to broaden the geographical distribution of research funds. This pressure can have, and I believe is having, serious effects on those institutions, particularly the private ones, which have been major recipients of government-sponsored research contracts. It has resulted, in essence, in a nationwide fall in support per faculty member for our leading institutions.

As the President's Science Advisory Committee once emphasized, "In science, the excellent is not just better than the ordinary; it is almost all that matters. It is therefore fundamental that this country should energetically sustain and strongly reinforce first-rate work where it now exists." Obviously in continuing to reinforce existing centers of strength we must also create new ones. We need more schools of science and engineering as good as the best we now have. However, we must achieve these not by diminishing the effectiveness of our existing centers but by constructive and *adequately funded* policies designed to encourage others to develop. Several new federal programs with this objective are already helping to build greater strength at a number of institutions and to achieve a wider diffusion of scientists and engineers. This goal will not be achieved by building on weakness. It will be attained, rather, by identifying those institutions which have shown the initiative and mobilized the support to strengthen themselves. More constituencies—communities and states—should determinedly set out to strengthen their institutions to the point where they are justified in appealing for new sources of funds, public and private, to help them grow stronger still.

Despite the problems I have identified and the concerns I have expressed, there is no question

that the partnership that has evolved between our universities and the federal government, though imperfect in parts, has advanced notably the progress of science and technology, has strengthened universities across the land, and has contributed richly to the national welfare. But I trust that I have demonstrated also that private institutions need even more funding from private sources to ensure that they do not become so dependent on government support that they cannot resist that kind of federal support that is incompatible with the highest standards of independent scholarship.

Variations in the public pulse and the political temper, both domestic and international, tend as never before to affect attitudes toward science and its support, now that government is so closely coupled with science. As a matter of public policy, we should seek to dampen out these extreme oscillations in our national attitude. As a matter of institutional policy, universities need to have the resources and the strength to ride out the winds of change. Indeed, they must keep the strength and the stability to *reject* federal support. They must have ample private capital to provide this strength and to guarantee the basic independence and freedom of their educational programs.

Private Philanthropy Needed Now

At the outset of this article I expressed strong optimism about the capacity of strong private institutions to solve their financial problems and the willingness of private philanthropy—of alumni and other individuals, of foundations, and of business and industry—to help them to do so. My optimism is based in part on the record of the immediate past, on what President Bowen of the University of Iowa has called "the miracles that have been achieved in the finance of higher education."

President Bowen finds his miracles across the whole domain of higher education, and he quite properly notes that the "achievement has resulted from the joint efforts of state and local governments, the federal government, private foundations and individual donors, and students and their parents, all of whom have generously supplied vast increases of funds in the form of appropriations, gifts, or fees." The total outlay for higher education in the United States this year will be more than \$15 billion, three times as much as it was in 1955. Yet private, voluntary support of colleges and universities has more than matched this increase, expanding more than three times over in less than a decade.

At the same time, the cost of excellence itself is steadily rising. One example of this is the growth of computer services. A panel of the President's Science Advisory Committee under the chairman-

ship of John R. Pierce of the Bell Telephone Laboratories recently concluded that the yearly cost of adequate annual computing service at higher educational institutions will rise to \$400 million a year by 1971 for four-year programs and two-year colleges (*see p. 47 of this issue*).

Private funds remain the principal sources of freedom money and essential venture capital. In a way not usually appropriate for government funds, they assist the emerging young scientist and the promising new idea. In our private institutions they provide the core support that is essential for stability and independence. They help in protecting the freedom of science. In all these ways private funds increase the return on the large public funds which the scale and importance of science now require. The federal government as a matter of policy should facilitate and encourage further this private support.

A specific example of the creative role of venture capital is the fund established by the late Alfred P. Sloan, Jr., '95, and the Sloan Foundation to support basic research in the physical sciences at M.I.T. This fund, amounting to more than \$20 million, is completely unrestricted and, indeed, completely expendable. As such, it gives the Institute's program great flexibility, which could not be supplied by any other means. The fund does not supplant federal support, but it does provide a significant balance to that support. And because of the freedom with which it can be used, it provides at once not only essential working capital for our intellectual enterprise but also the means to support unorthodox approaches, to explore more boldly new fields, and even to take some of the risks one expects of a strong private institution. This kind of fund quite obviously represents a bulwark against the possible vicissitudes of federal aid and, for the private institution, represents a source of stability and a resource for action.

The Sloan Basic Research Fund illustrates the way in which private gifts can provide both a balance and an articulation with federal grants. Another example of this kind of exceptionally useful fund is the unrestricted grant of \$5 million recently made to Yale by the Ford Foundation. Both exemplify the essential kind of support that assists what I have called the core strength of the university. Every institution must have adequate funds for salaries, student aid, venture capital, the enhancement of quality and other basic needs, and it must have adequate buildings in which to carry on its work. It must have those kinds of funds which give it stability, flexibility, and independence. It has exceptional need for those kinds of funds that are unrestricted and that can be applied broadly to the core strength

of the institution. It is generally easier to obtain funds, particularly from government, to undertake additional activities than to meet core needs. Here, then, is the special and essential role of private support.

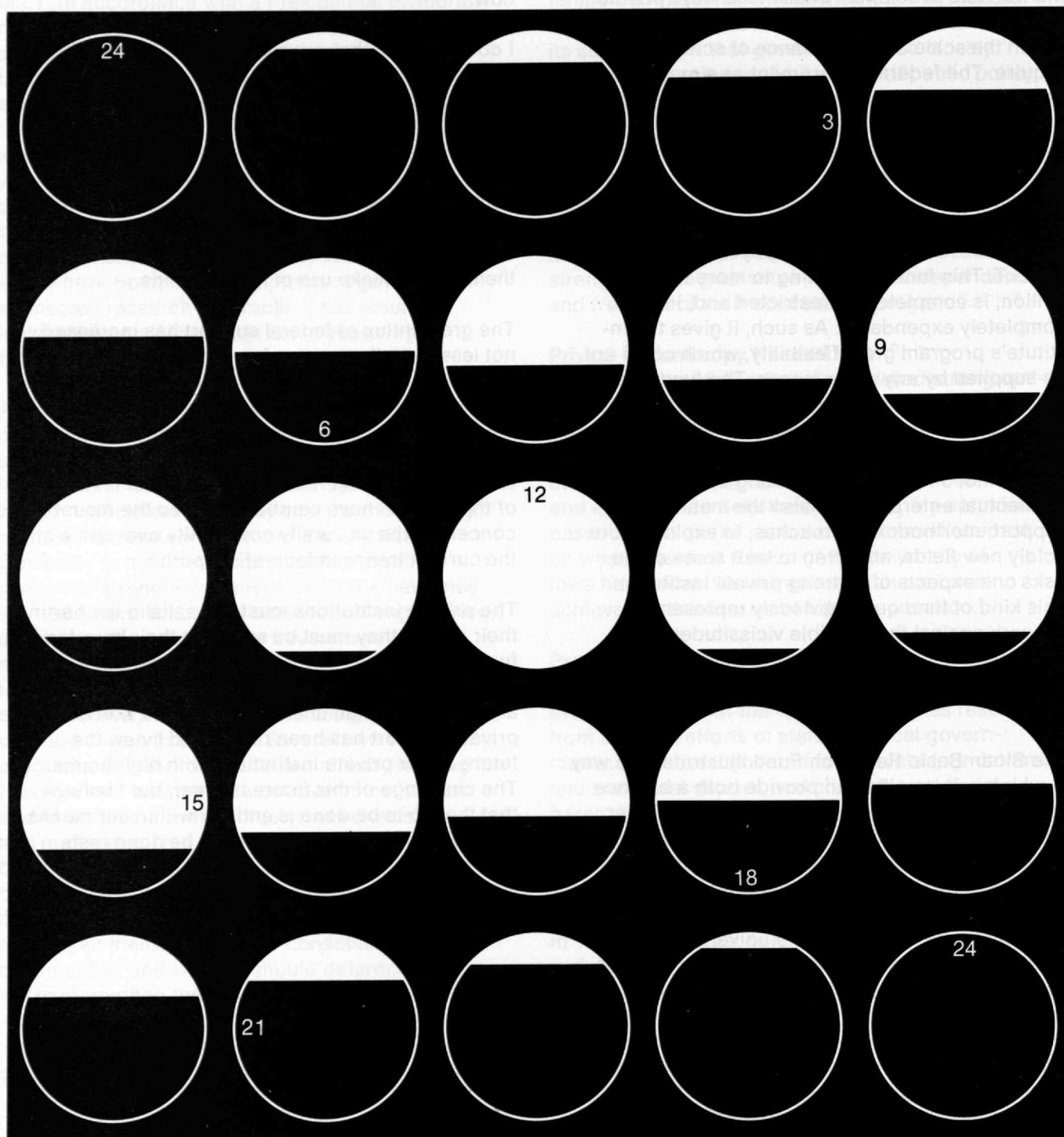
I plead, too, that those who can give large sums realize the unprecedented opportunity to ensure the continuing strength of higher education. They can achieve maximum good, not by homeopathic grants, but by grants of critical size to leadership institutions. We need a great concerted effort on the part of philanthropy to raise its sights and boldly to undergird the future of our leadership institutions now.

I do not intend that private sources of funds should refrain from supporting important new research or important new programs of various kinds, but I do believe strongly that one of the urgent requirements now and in the years ahead will be to focus private funds on preserving the underlying central strength and stability of our private institutions, and on assisting them to maintain that freedom of action and objectivity that will enable them best to make use of federal funds.

The great influx of federal support has increased, not lessened, the needs of colleges and universities for private aid. Educational institutions must have stability as well as strength, and a balance and diversity of funding. Federal support has been indispensable and, in the main, beneficent; but it also entails certain risks. I have touched on some of these, and I have emphasized also the mounting concern in the university community over some of the current trends in federal support.

The private institutions must be realistic in charting their needs, they must be sure that their invested funds are expertly and not routinely managed, they must know and control their costs wisely, and they must plan ahead. Happily, the tide of private support has been rising, and I view the future of our private institutions with high hopes. The challenge of this future is great, but I believe that the job to be done is entirely within our means. The decision as to whether it will be done rests with the American people.

James R. Killian, Jr., '26, has held a central role in higher education and in American science and technology for two decades, as President of the Massachusetts Institute of Technology and now as Chairman of its Corporation, as the first Presidential Science Adviser, as Chairman of the President's Science Advisory Committee, and as a corporate director and consultant.



Almost every metabolic function of the body shows a 24-hour cycle of activity; far from being mere curiosities, these rhythms have great significance in medical diagnosis and the efficient use of food

Richard J. Wurtman

Biologic Rhythms in the Body

Single-celled organisms exist at the mercy of circumstance. When times are good, they are very good; a single bacterium can produce 10^3 offspring in a matter of hours. However, when conditions are unfriendly—when it is too hot or too cold or when no water is available—vast numbers of single-celled lives can be snuffed out in a very short time. For multicelled animals, life proceeds much less erratically. The need to synchronize the activities of a community of cells precludes explosive increases in the size of the population. Furthermore, powerful mechanisms exist which make it likely that individual organisms will survive for a long time, in spite of a hostile environment. One of the most important of these mechanisms is metabolic control of the internal environment.

Almost a century ago, the great physiologist Claude Bernard formulated the concept of the *milieu intérieur*, the internal environment. According to Bernard the individual cells of mammals, unlike the single-celled organisms, were buffered from changes in the outside world. The more complicated organisms bathed each cell in an extracellular fluid whose temperature and chemical composition were kept constant by complex regulatory mechanisms. These mechanisms allowed the mammal to accommodate to a variety of external environments: "The fixity of the internal milieu is the necessary condition for free existence."

Feedback in the Body

About four decades ago Walter B. Cannon, a physiologist at Harvard Medical School, invented the term 'homeostasis' to describe those "coordinated physiological processes which maintain most of the steady states" in the internal environment. According to Cannon, homeostatic processes generally involved sensors, which detected small changes in the extracellular fluid, and effectors (like the lungs, kidneys, skin, and liver), which re-established the *status quo* by removing the excess carbon dioxide, hoarding the water, dissipating the heat, or restoring the level of sugar

in the blood. The sensors and effectors were usually anatomically distinct, and were joined by the body's two communications systems, the nerves and the hormones.

At this time systems engineering concepts had not entered the preserve of the physiologist; cybernetics was then in its infancy, and it crossed the Charles River only slowly. Hence, the key role of closed feedback loops in homeostatic mechanisms was not acknowledged until several years later. There can, however, be little doubt that feedback was what Cannon had in mind when, for example, he stated that "the delicate control of body temperature indicates that somewhere in the organism a sensitive thermostat exists which regulates the operations which we have been considering."

Toward the end of Cannon's career, a generation of endocrinologists was busy defining the special relationship between certain endocrine glands and the 'master gland,' the anterior pituitary. Their studies showed that the rate at which the gonads, thyroid, and adrenal cortex released their hormones into the blood was stimulated by other hormones known as trophins, which originated in the pituitary gland. However, each of the peripheral hormones then acted back on the pituitary to inhibit the secretion of its own trophin. As a result, a steady state existed in which, for example, the levels of circulating testosterone and of the pituitary hormone which stimulated its secretion remained more or less constant. The endocrinologists made a great contribution to physiology by clearly identifying closed feedback loops within the body and relating them to the control of metabolism.

It soon became apparent that such feedback loops could be found as a component of essentially all biologic control systems. Unfortunately, not until much later was it recognized that closed feedback loops did not provide the *only* mode of regulation available to the body. Just as man-made regulatory systems actually exhibit much more

versatility than that required to keep a function constant, so also the body can choose to change a straight line to a continuous or discontinuous curve. The endocrine model for metabolic control of the internal environment was perhaps too successful; a generation of medical students and biologists learned that feedback was the only way the body worked.

Four Forms of Control

Feedback is the way that much of the body works *sometimes*. As an example, a major component of the system which keeps the level of calcium in the blood from falling too low can be described as a simple closed feedback loop contained entirely within the parathyroid glands. As the blood passes through parathyroid cells, they sample its calcium concentration and compare it with a built-in set point. If calcium is found wanting, the cells emit a hormonal signal which instructs calcium storage depots in bone to release more of the mineral. Another simple feedback system involving a recently discovered hormone (thyrocalcitonin) operates to lower calcium concentrations when the set point is surpassed. Acting in concert, these mechanisms keep blood calcium levels within a very narrow range of concentration.

However, this kind of constancy is much more the exception than the rule, especially among biologic regulatory systems that involve glands. Studies over the last 20 years have brought physiologists to the recognition that the systems which control the internal environment are capable not only of maintaining homeostasis but also of producing change, when change would be more appropriate. At least three situations are now recognized in which the level of a controlled function in the internal milieu changes:

Variable Set Points. The closed feedback loop continues to operate, but there is an increase or decrease in the level which the controlled function approximates. Sometimes the change in set point is generated by a sensory input from the environment. Emotional stress increases the steady-state rate at which the adrenal gland secretes hydrocortisone; cold enhances the secretion of the thyroid hormones; environmental lighting modifies the age at which girls undergo puberty. Sometimes the change in set point appears to be programmed into the genetic apparatus, in a manner which suggests prolonged embryonic development. Perhaps the best example of such a programmed change is puberty itself. The secretion of testosterone into the blood is regulated in both infant and adult by a closed feedback loop. But the point around which feedback operates changes drastically with adolescence. The tim-

ing of pubescence is subject to modification by environmental factors such as light, but the process itself occurs in the absence of such factors.

Open Loops. In times of crisis some components of the extracellular fluid may cease to be regulated. As part of the 'fight or flight' response to danger, the medullary portion of the adrenal gland may release enormous amounts of adrenalin; as a result, the concentration of sugar in the blood rises far above normal. In a severely hemorrhaged animal, circulating hydrocortisone no longer inhibits the release of the pituitary hormone, ACTH, which is responsible for its own release from the adrenal cortex.

Biologic Rhythms. Most regulated functions in the internal milieu (and elsewhere in the body) show characteristic periodic variations. Such rhythmic changes can be of any frequency from very short—the pulse, for example, which represents contractions of the heart—to very long—the annual migrations of birds, for instance. However, the rhythms most frequently encountered in metabolic systems show a dominant periodicity of about 24 hours; indeed, it is an unusual metabolic function which, properly examined, does not show this daily cycle. Such rhythms occur in body temperature, behavior—the tendency of people to sleep when it is dark and to eat and work during the daylight hours, for example—glandular secretion, the biochemistry of the brain, the concentrations of certain amino acids in the blood, and so on almost ad infinitum.

Biological Clocks and the Body

Biologists know much less about the production and significance of biologic rhythms than about the other forms of metabolic regulation, probably because such rhythms have only recently become the objects of scientific study. So strong was the dogma that homeostasis underlies all aspects of physiologic regulation that until a decade or two ago many biologists attempted to explain even 28-day cycles (ovulation in humans) as delayed feedback responses. The unfortunate commitment of some students of rhythms to an approach rooted in Continental Mysticism has also hindered the emergence of this field as a science. To this day, much of the effort expended on rhythm research seems to be concerned with demonstrating firstly that everything measurable has 'got rhythm' and secondly that the whole body dances in time to a single 'biologic clock,' hidden like a Holy Grail in a secret place deep within the brain.

Twenty years ago it was the consensus of the small community then investigating rhythms that all 24-hour oscillations in mammalian metabolisms were ultimately generated by parallel cycles

in the external environment. The prime mover could be light (day and night), temperature, humidity, availability of food, or even cosmic rays. Then a series of experiments in the 1950's showed that several biologic functions in experimental animals retained their rhythmicity even when the animals were deprived of all known cyclic sensory inputs, that is, by being housed in a constant environment. From these observations came the hypothesis that all daily rhythms were generated by endogenous information; in other words, one or more 'clocks' inside the body provided the oscillating signals that generated glandular and other rhythms. The biochemical mechanisms ultimately responsible for these internal timekeepers were then an enigma; they remain so today.

According to this schema, cyclic environmental inputs could influence biologic rhythmicity only as time-givers. In the absence of, for example, a day-night cycle, the daily rhythm in hydrocortisone secretion would be expected to persist. (It does.) It would no longer show a frequency of precisely 24 hours; instead, it would 'free-run' with a period somewhat longer or shorter, and characteristic of both the species and the particular metabolic function. Environmental cycles served only to entrain biologic rhythms in such a way that maxima and minima occurred regularly at a given time of day. A 24-hour rhythm which could be shown to 'free-run' in the absence of lighting and other environmental cycles was termed 'circadian,' meaning about 24 hourly.

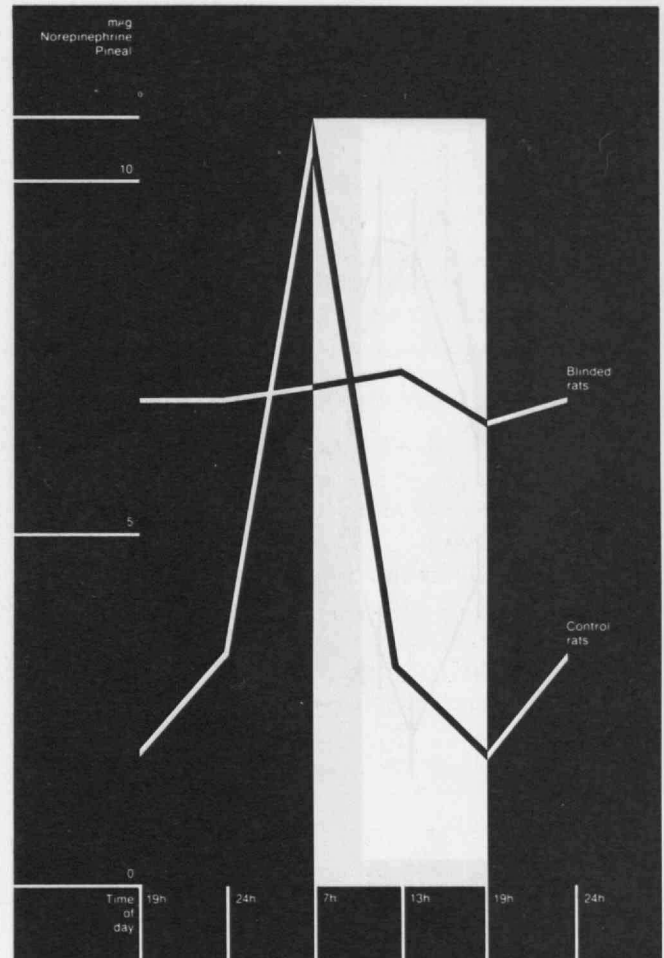
Internal or External Rhythm?

It now becomes clear that neither the exogenous nor the endogenous school of rhythm production had a monopoly on truth. It is possible to demonstrate experimentally that some biologic rhythms are simply cyclic responses to cyclic environmental inputs; others persist, no matter how much care is taken to stabilize the environment.

Exogenous rhythms have been identified which are generated by light and by foodstuffs. Two light-dependent rhythms have been observed in the pineal gland of the rat. This organ is located within the brain and produces a hormone called melatonin. In lower vertebrates, such as frogs, the pineal is not a gland at all, but functions as a 'third eye'; it responds to light just like the retina by generating nerve impulses which are transmitted to the brain.

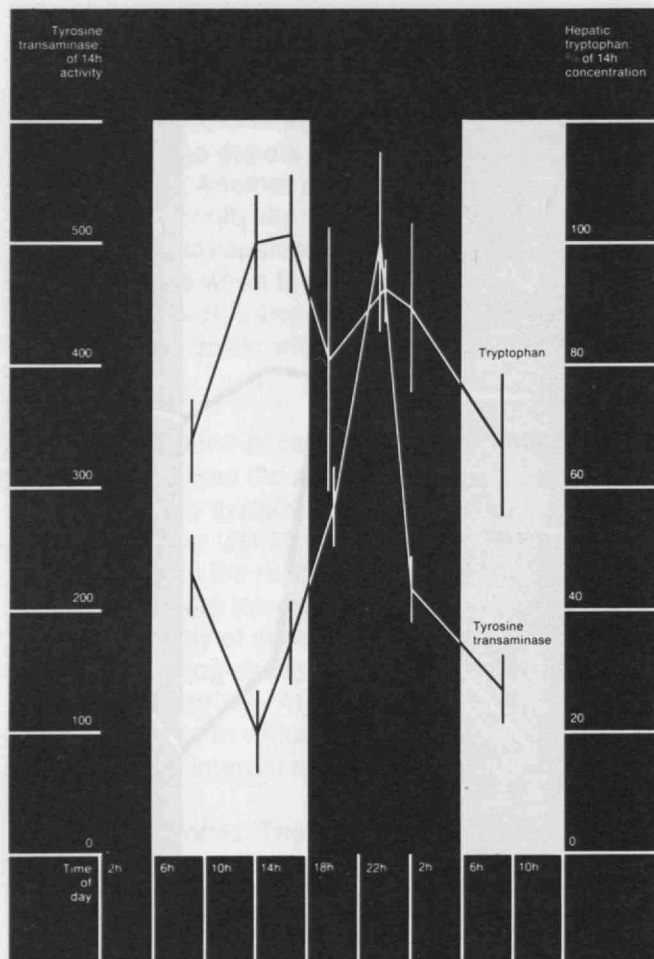
In the mammal the pineal is no longer photo-receptive. However, its level of glandular function continues to depend on light, via an indirect mechanism: a small part of the information generated when the eyes perceive light travels to the pineal via a special nerve bundle. (Most of the

External stimulus of light generates the 24-hour rhythm in the synthesis of melatonin, a hormone produced in the pineal glands of mammals. Part of the information received when the eyes perceive light travels through a nerve bundle to the pineal; there the nerves announce the existence of the light by releasing norepinephrine, which causes production of more or less of the enzyme that produces melatonin. In normal rats the amount of norepinephrine in the pineal varies with the passage of light and dark through 24 hours; in blinded rats this variation is absent.



light information remains within the brain, of course, serving the function of vision.) Within the pineal, the nerves signal the presence of light or darkness by releasing more or less of a neurotransmitter, norepinephrine. This compound then modifies the activity of the pineal enzyme which makes the melatonin. Light inhibits the enzyme and darkness stimulates it. Hence, much more melatonin is produced and secreted into the circulation at night than during the daylight hours. This provides the blood with a signal which can tell any organ capable of decoding it whether the animal is in an environment of light or darkness. Since the world in which we happen

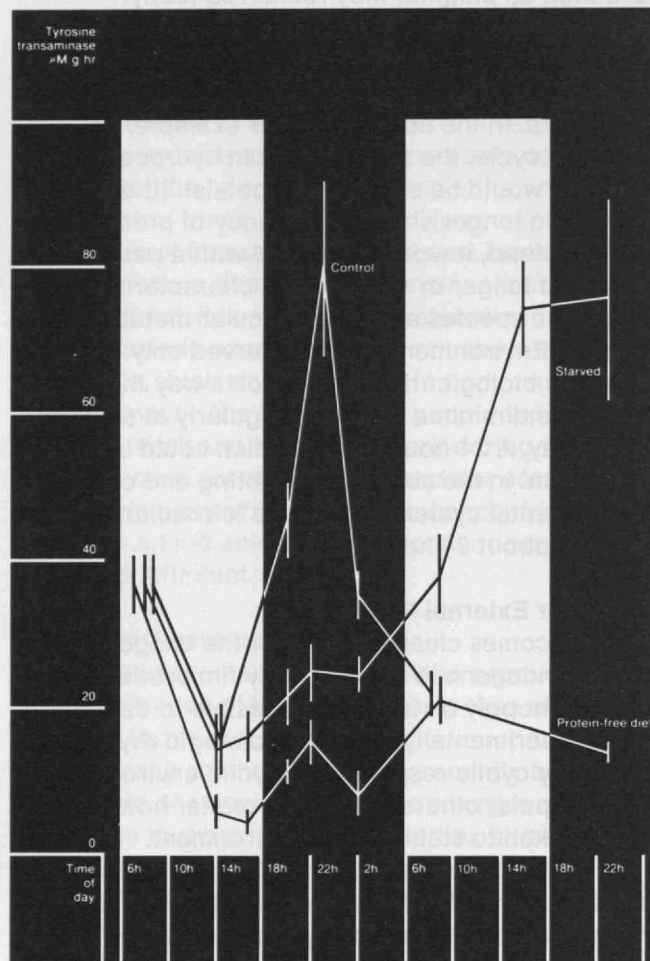
Protein in foodstuffs triggers an important daily rhythm in the activity of the enzyme tyrosine transaminase in the livers of rats. This enzyme, which breaks down the amino acid tyrosine, fluctuates with the time of eating and the protein content of the food. Ingestion of protein normally starts several hours before the onset of the daily dark period; this causes large amounts of amino acids, such as tryptophan, to be delivered to the liver. The arrival of these amino acids signals the liver to make more tyrosine transaminase (left). Thus the concentration of tyrosine transaminase shows a characteristic 24-hour rhythm. In rats fed on a protein-free diet, however, this rhythm disappears (right). If the rats are starved completely, the concentration of tyrosine transaminase varies in a different manner, owing to the stress brought about by lack of food.



to live has one day and one night per 24 hours, the amount of norepinephrine in the pineal's nerves and the activity of the melatonin-forming enzyme in the gland itself also vary with 24-hour rhythms which are totally light-dependent. When rats are blinded or are housed under conditions of continuous darkness, both pineal rhythms disappear, even though other metabolic phenomena in this organ continue to show daily oscillations.

At M.I.T., we have recently demonstrated a 24-hour rhythm generated by a particular foodstuff. The liver of all mammals contains an enzyme, tyrosine transaminase, which functions to degrade an

important amino acid, tyrosine. In rats the activity of the enzyme—that is, the rate of the enzyme-catalyzed reaction—varies fourfold during the day: it is highest several hours after the onset of darkness and low for most of the light period. This rhythm appears to result from the interaction of two factors: the tendency of the animal to concentrate its eating behavior around the start of the daily dark period and, more important, the chemical nature of the ingested foodstuffs. The rat consumes protein; this is digested in the gut, causing another amino acid, tryptophan, to be carried to the liver in high concentrations. It appears that the sudden rush of tryptophan after



the animal starts to eat signals the liver to make more of the tyrosine-metabolizing enzyme. In my view, many additional enzyme rhythms will be found to be produced by dietary tryptophan.

Most other metabolic rhythms are still believed to be of endogenous origin. However, it should be obvious that this is at best an exclusion diagnosis. One cannot prove that a rhythm is endogenous until an endogenous oscillator has been identified; one can only show that the rhythm does not disappear when the subject is deprived of a *particular* environmental cycle. As the sophistication of biologic rhythm studies increases, more and more

'endogenous' rhythms will probably be found to be generated by environmental factors.

The Significance of Rhythms

What is the physiologic significance of metabolic rhythms? Of what advantage could it be to the body that the concentration of a certain amino acid in the blood is only half as great at 2 a.m. as it is eight hours later? Essentially nothing is known which can explain how rhythmic changes in the internal milieu might act to our advantage. The same can probably be said for the most obvious rhythm of all, that of sleep and wakefulness. However, our inability to justify biologic rhythmicity on physiologic grounds should not lead us to dismiss it as a curiosity or an annoyance. New mechanisms for generating and transmitting metabolic rhythms have continued to appear as each new group of animals has evolved. If one believes in Darwin and natural selection, one is almost obligated to keep the faith that biologic rhythms in daily metabolism serve some purpose.

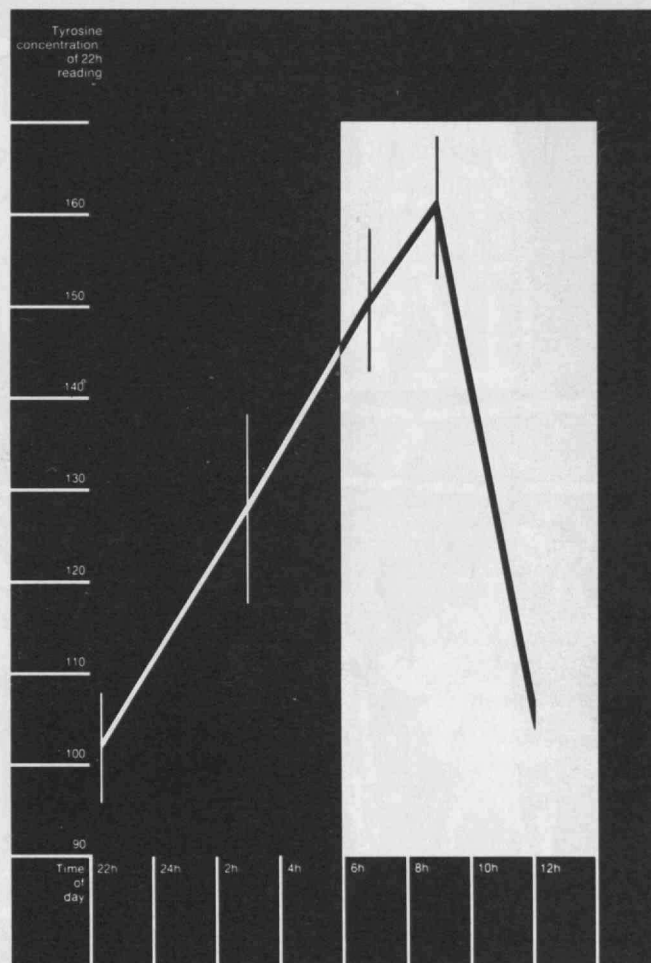
Although the physiologic significance of metabolic rhythms is not yet clear, their importance to clinical medicine is certainly recognized, if only because the physician who is not aware of their existence may make serious errors in diagnosis. For example, the concentration of hydrocortisone in human blood is normally low at midnight and much higher by 8 a.m. Patients with woefully inadequate adrenocortical function might thus appear to be normal if their blood hydrocortisone levels are sampled only at midnight. By the same token, a body temperature of 99°F. might be normal at 5 p.m. and evidence of a fever at 7 a.m.

Our studies at M.I.T. give us some evidence that metabolic rhythms may influence the manner in which the body utilizes food. It seems likely that the nutritional value of protein is somehow related to the hour of day when it is ingested. Perhaps further studies will lead us to the conclusion that we should eat steak only for breakfast—although I strongly hope that this will not be so.

The extent to which 24-hour rhythms complicate East-West travel (by making the travelers feel miserable) is only too familiar to many readers. What is not known, however, is how much the health and intellectual performance of space travelers will be compromised by the absence of the 24-hour light-dark cycle.

Clearly our metabolic regulatory systems operate within a much broader repertory than anyone thought possible a decade or two ago. This new freedom tends to make life much more fun for the student of mammalian biology. It also tends to accentuate his separateness from colleagues

Internal biological clock apparently controls the variation of tyrosine in the blood of human beings. Concentration of this amino acid, which depends on many complex factors in addition to the presence of tyrosine transaminase referred to in the previous figure, fluctuates in people on protein-free diets in just the same way as in people consuming protein in their food. The figure shows the variation of tyrosine in blood samples from M.I.T. students fed on a diet very low in protein, during an experiment conducted by the Department of Nutrition and Food Science. This suggests that the nutritional value of dietary protein can depend on the time of day at which it is consumed.



who work on single-celled organisms. The existence of a regulated *milieu intérieur* constitutes an enormous biologic watershed. The followers of Claude Bernard may speak the same biochemical language as those of Louis Pasteur, but more often than not they talk about very different problems.

Dr. Wurtman came from the National Institute of Mental Health to M.I.T. as Associate Professor of Endocrinology and Metabolism in May of last year. He received his A.B. degree from the University of Pennsylvania and his M.D. from Harvard. Some of the studies he describes in this article were supported by grants from the U.S. Public Health Service (AM-11709) and N.A.S.A. (NGR-22-009-272).

Though this is generally considered a banquet scene (depicted, in fact, in the top row), the whole work could well show the kinds of produce generally brought as taxes or "gifts" to the temple or palace at Ur. This work is part of the so-called "Standard of Ur," a hollow wooden box decorated with mosaics of shell, red limestone and lapis lazuli inlaid in bitumen. (Photo: Hirmer Fotoarchiv München)



The earliest cities grew in conflict, and the resolution of successive crises was the mark of urban development 7,000 years ago

Arthur R. Steinberg

Cities in the Beginning

The area in which to examine the beginnings of cities is southern Mesopotamia (known as Sumer), the land of the Tigris and Euphrates Rivers, in the period between 5000 and 2000 B.C. The evidence for the start of this extraordinary phenomenon of urbanization is highly ambiguous and confusing. It consists of two kinds of sources—archaeological and written. Ideally the two could be associated with each other, so that the written sources might inform us about the excavated remains, but this is only rarely the case; usually each source gives wholly independent cultural information, and each as well has its own intrinsic problems.

The archaeological material of the important early periods with which we are concerned here is generally deeply covered by later remains which must be removed before we can find out about the beginnings of cities. And archaeological sites have traditionally been chosen for the wealth of exotic material they might produce rather than for the information they might give on the daily life and habits of earlier societies. Thus the natural areas to excavate have been tombs, temples and palaces which are surely the most spectacular monuments of Sumer, but hardly the most informative.

The written sources (the Sumerians are credited with the invention of writing) present almost as many problems as they help to solve. The earliest experiments in writing are by no means fully comprehensible to us; in fact, even later Sumerian is not completely interpreted. The sources are also often badly damaged. Like the archaeological material (and because of its bias), the written documents are highly selective, coming from few different kinds of places and yielding information which is repetitive and limited. But the greatest difficulty with written documents is the temptation they offer to archaeologists who want to use them to illustrate earlier nonliterate periods. Thus, in order to fill in earlier periods that are only known archaeologically, we are tempted to project backwards in time from later documents the situations that interest us, making certain 'adjustments' for the lapse

of time. Though this is a particularly dangerous procedure, it has been used with great skill and conviction recently by some prominent scholars and is a most tempting and useful device.

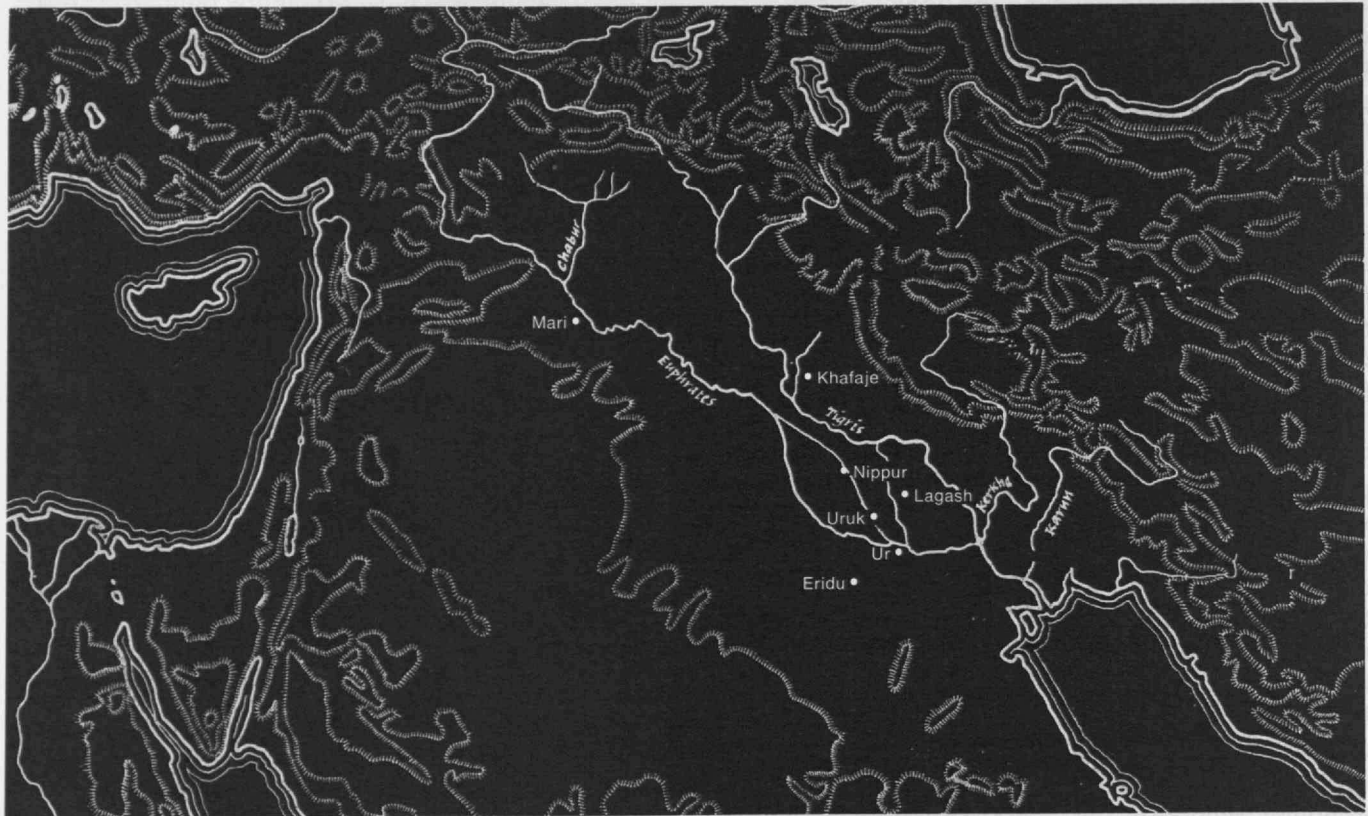
So it is that despite all these frustrations, we now have a fairly sound framework linking important architecture, sculpture, metalwork and written documents to give us some kind of picture of the earliest cities.

Organizing the Manipulates

The long and gradual development of civilization to the point where cities were built in Sumer seems to begin not in that area itself, but farther north and east, on the foothills of the 'Fertile Crescent' at 1,250 to 3,000 feet elevation, which have an annual rainfall of 20 inches or more. It is precisely in this area that wheat, barley, sheep and goats are found in their wild, undomesticated state, and that the manipulation of these essentials of subsistence first took place. Farming and herding seem to have been closely connected with each other in this area, and it is with the development of these basic arts that the small farming village first became established. Parts of the population in this hilly area were probably relatively sedentary while others were more nomadic in their habits—a basic dichotomy of cultural and societal patterns that later played an important part in the growth of urbanization.

As domestication of the staples progressed (probably with a concomitant development in social organization), people gradually transplanted their manipulates from their natural ecological niches to the immensely rich alluvial plains—a new environment of reduced rainfall and annual flooding (where farming could only be done with irrigation) which required new methods and organizations to implement them. This gradual movement from the mountains to the plains, and from north to south along the rivers, took place in the course of the sixth and fifth millennia B.C., and it is from this period that we first encounter evidence of small settlements in the alluvium.

Civilization as we know it began in Mesopotamia and Iran—first in the foothills to the north of the 'Fertile Crescent' of the Tigris and Euphrates Rivers and then in the valleys themselves. The growing wealth of simple villages based upon farming and herding in the well-watered hills made possible migration to the richer alluvial plains below. (Map adapted from *5000 Years of the Art of Mesopotamia* by Strommenger and Hirmer, New York: Harry N. Abrams, Inc.)



The type-site for such a village is at the same time the farthest south and, according to tradition, the oldest Sumerian city, Eridu. It lies amidst marshes teeming with all kinds of fish and birds; it is also the home of the important Sumerian god Enki. As luck would have it, the first thing excavated there was a stratified series of 16 temples (probably dedicated to Enki) ranging from about 5000 to 2000 B.C. The presence of a small temple on the bottom level containing cult paraphernalia like that of successive levels, including very fine pottery, clay mosaic cones, nails, sickles, and great quantities of fish bones, raises some important questions: Who ran the temple and saw to its frequent rebuilding? Who made the pottery and other clay implements; who the copper tools? How did the foreign material like copper and stone arrive there? What are all the fish bones doing in an agricultural community?

The Seeds of Conflict

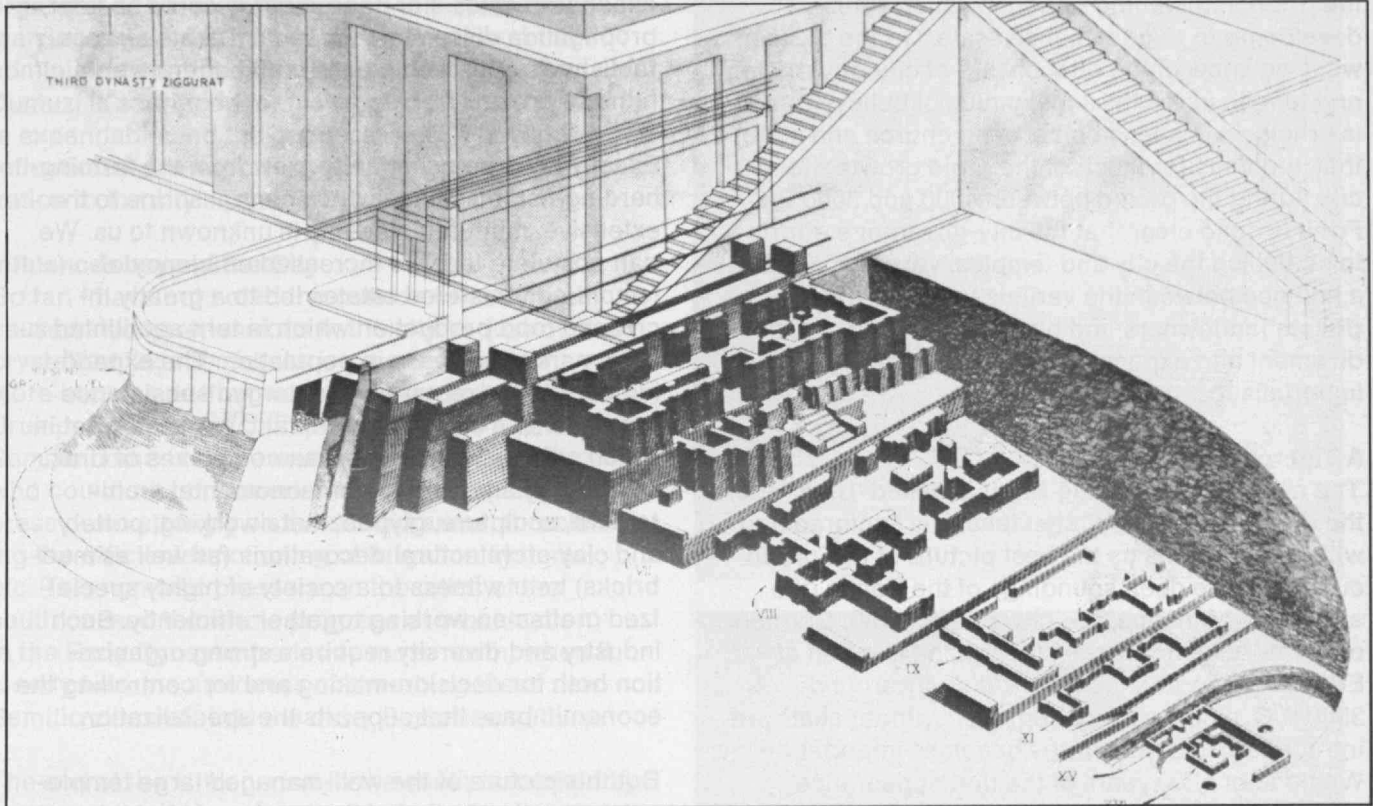
In trying to answer these questions we obtain a picture of a reasonably diversified society. No longer is the subsistence base only farming and herding; it now includes raising cattle, fishing and cultivation of the date palm. Farming had probably increased in scale too, for wheat and barley were grown in large drained and irrigated units. Gardening was reserved for vegetables and the like.

Social organization was apparently based on a priesthood which controlled the large-scale architectural undertakings. There would also appear to have been potters, and metalworkers, while some group must have attended to foreign trade and transportation. Presumably the large-scale drainage and irrigation system also needed some organization. So we have here the beginnings of social stratification.



This impression of a cylinder seal from Uruk shows a god or priest with cult objects traveling on a boat, the main form of Sumerian transportation. The cylinder seal was an important device for making commerce efficient: each merchant had his own design by which to designate his personal documents and goods. (Photo: Vorderasiatisches Museum, Berlin)

The series of temples at Eridu (below), built one upon another, illustrates about 2500 years of urban renewal of the main temple (and probably administrative center) of the city. (Drawing from Gideon, *The Eternal City*)



The principal preoccupation of this community (as of earlier and later ones) must have been subsistence. But the greatly enlarged, enriched and variegated subsistence base must have given rise to surpluses, the storing, administration and distribution of which must have led to some new kind of self-perpetuating organization. In addition, the surplus could support many types of nonfood-producing specialists who could greatly increase the economic base, and hence the well-being, of the whole community.

The temple area with a nearby large building, on the lowest levels, lends credence to the picture of a priestly class of some kind controlling this whole complex system. So too does the early myth entitled *Enki and the World Order*. The simple story, really a catalogue of Enki's inventiveness, takes place in Eridu. It recounts how Enki built himself a

temple in the marshy deep which abounded in fish, snakes, birds and all sorts of flora, created a priesthood to serve him and his temple, and introduced all the crafts to Eridu. From Eridu he proceeded to spread civilization to the rest of Sumer, bringing farming (grain) and animal husbandry (cattle and sheep) with him wherever he went. He then established the various fields of endeavor for the other gods; in so doing he created all the other important tasks of mankind.

This myth tallies well with the picture that the archaeological remains of Eridu present—the gradual organization of mankind into a productive unit that we are later to call the city. Significantly, both the remains and the myth suggest that in fact the priesthood may have controlled this whole complex structure. To what extent a civil, nonreligious organization controlled some phases of

these earliest communities we do not know; indeed, this remains one of the vexing problems of the whole story. For from the time of Eridu on (after 5000 B.C.), it is generally maintained that Sumerian cities were essentially temple-estates controlled by a priestly hierarchy with a chief priest who also had military and secular political functions. It has, however, become increasingly apparent (from both archaeological and documentary sources) that the secular power divorced itself more and more from the priestly until the two stand in reasonably open conflict with each other after about 2800 B.C.

Unfortunately we know little or nothing about the important intervening period in which cities were developing to their immense scale. On the basis of what we know of the relationship of city-governor and temple in the third millennium, I believe that it is precisely this tension between church and state that accounts for much of the rapid growth of the city during the period between 4000 and 3000 B.C. For it is quite clear that the city-governor's efforts to embellish the city and temples, yet still maintain a balance between the various temple-estates, private landowners and himself, led to an aggrandizement and expansion of cities bordering on the imperialistic.

A Vigorous Expansion

The next stage following Eridu is called 'Uruk' after the city where it was first extensively explored and which still affords us the best picture of this urban culture. In the deep soundings of the Eanna (the sanctuary of Inanna, the city's patroness), German excavators found traces of a horizon like that at Eridu. But this changes and suddenly around 3500 B.C. a new pottery appears, cylinder seals are introduced, and metallurgy becomes important. Within about 200 years of the first appearance of this new material the city underwent an enormous and energetic expansion. By this time it contained not only the huge multi-templed Eanna, but also a temple to Anu, built on a 40-foot tower, and between the two yet a third precinct where the walls of the temple were poured in plaster, rather than built of mud-brick. Here we no longer have the tightly organized settlement of Eridu, huddled around the temple of Enki on its little mound in the marshes, but a large city with at least three separate monumental sanctuaries.

The most important single invention of this period of urbanization is writing. The first real evidence for an extensive written language comes with the temple accounts and word-lists on clay tablets from level IV b at Uruk. The writing developed from a pictographic one (like hieroglyphics) to the addition of abstract signs with conventional meanings, to use of the sign as a phonogram, and

finally to the alphabet. Writing clearly developed from a need to keep accounts more complex than a man could remember and for longer periods than a man's active lifetime.

It is, of course, significant that the first writing is not literary, nor even religious, but economic: the Sumerians wanted to know exactly what their temple storerooms contained (though I must note that only temple areas have been investigated in this period!). In the following Early Dynastic period the use of writing broadened to include lists of gods, contracts for sale of land, and dedicatory inscriptions in sanctuaries. It is the introduction of writing that lends a whole new perspective to our expanding cities. For once records could be kept, propaganda disseminated, and a literate elite established, urban complexes could operate on a hitherto unknown scale.

Exactly how the community grew from the farming-herding-fishing village with a central shrine to the extensive, multi-templed city is unknown to us. We can postulate that the increased efficiency of temple-administered estates led to a greatly increased food production which in turn accounted for a marked increase in population. The expanding population required an enlarged subsistence base and so a cycle of growth and expansion set in which culminated in the urban complexes of Uruk. The quality and quantity of monumental architecture, sculpture, glyptic, metalworking, pottery and clay architectural decorations (as well as mud-bricks) bear witness to a society of highly specialized craftsmen working together efficiently. Such industry and diversity require a strong organization both for decision-making and for controlling the economic base that supports the specialization.

But this picture of the well-managed large temple-estate running a whole city the size of Uruk cannot be complete. If the largest temple, the Eanna, ran the city economy, what of the estates of the smaller precincts? Did they also have a priestly hierarchy? Were they independent of the Eanna hierarchy? What was their part in the growth of the whole city? Later sources show that a secular ruler co-ordinated the various estates, relying most heavily on the largest ones. Unfortunately we do not know if this is the case in Uruk, for we know little or nothing of the secular ruler. I have suggested that later there was a constant friction between temple and city-governor which kept the cities expanding to the point of empire. Are there traces of this in early Uruk too?

There is a cycle of myths about Inanna, the patroness of Uruk, who early in her career succeeded in carrying all the attributes of civilization from her father Enki's home at Eridu to Uruk. The city

prospered greatly as a result. She also took a mortal husband, Dumuzi the shepherd, in an elaborate ceremony, the gist of which was that he brought rich gifts to her storehouse in the Eanna and cohabited with her, after which the city prospered even more. We know from the marriage text that this ceremony was performed annually, probably to ensure the well-being of king and city. But Dumuzi's lot was not a happy one: Inanna forced him to take her place in the Underworld, so that she could continue to rule in Uruk. Dumuzi's marriage to Inanna apparently represents some kind of joining of the temple-estate (represented by the goddess) with the city government (Dumuzi). He seems to be taken on by her as a provider and organizer of her storehouse, and this symbolic marriage might indicate some such union in the administration of the city. It is interesting that Dumuzi is sacrificed for his wife: clearly the mortal is expendable and the goddess is not—possibly a reflection of the importance of the temple organization to the city's prosperity.

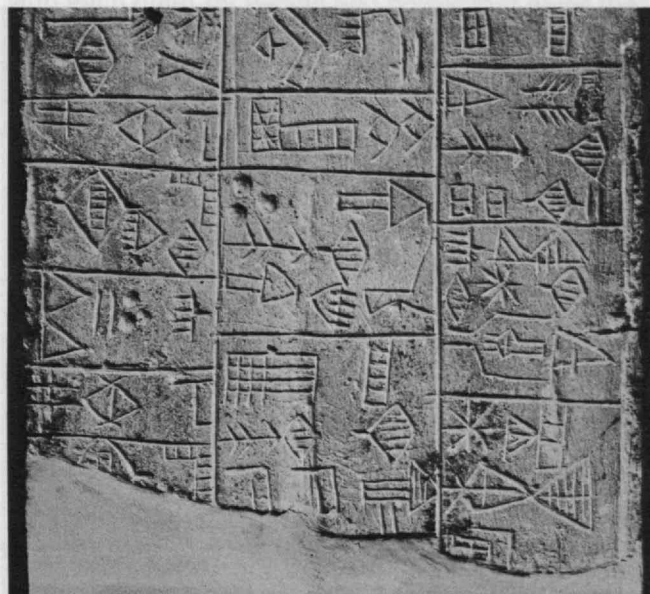
Influences beyond the City

So far, I have not noted the *outside* forces which caused still more tensions in the city to destroy it or crystallize its inner forces into something still more impressive than we have seen during the Uruk period. One such important force was the Semitic nomads of the western and northern deserts who could cut off Sumerian trade routes, and could press down strongly on the settled areas, threatening the efficient functioning of irrigation systems, etc. This nomadic pressure on the cities of the south caused the whole progress of urbanization in the Early Dynastic period to move north, when it clearly became a process of absorbing these new Semitic elements into the older Sumerian culture.

The end of the Uruk period in the south is marked by a cultural decline or impoverishment of sorts, attested by less elaborate building programs, and degeneration of the pottery and seal-carving; in fact, only the art of writing continued to develop from its beginnings. This may be explained, in part, by economic impoverishment brought about by salinization of the overirrigated and underdrained fields of southern Mesopotamia. But the major, or possibly a concomitant, cause would seem to be the Semitization of northern Mesopotamia (probably brought about by nomadic movements) and the strains that these new cultural forces imposed on the south. As a result, the balance of power in Sumer moved north, to Kish and the Diyala region, and the internal structure of the city also changed.

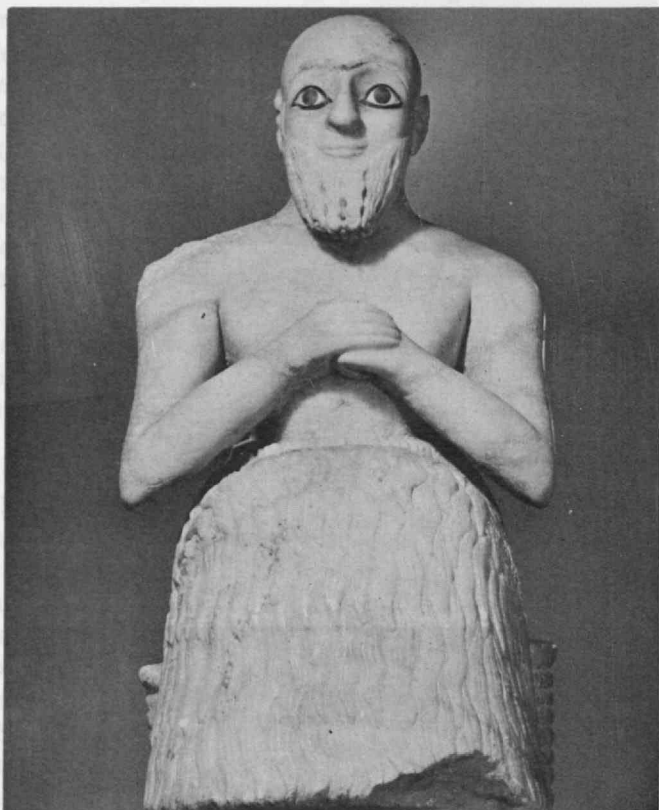
All the cities of the Early Dynastic period (including those of the south) were ringed with heavy walls, and we hear of city fighting city over water rights, boundaries, and just plain wealth. But now the

Writing is one of the most significant inventions of the Sumerians, for it enabled them to keep accurate records of their economic affairs and thus led to the rapid growth of their high urban culture. These two tablets show development from a pictographic script, below, to a more cursive cuneiform script, top. (Photos: copyright British Museum)



Abikhil, a typical Sumerian high temple official, was superintendent of the temple of Ishtar (Inanna) at Mari; such men were responsible for the smooth functioning of the complex temple-city relationships in the Early Dynastic Period. The statue is of alabaster with shell, lapis lazuli and bitumen inlays. (Photo: Hirmer Fotoarchiv München)

The Goddess Inanna receives gifts of produce from the fields so that she might assure the city's future prosperity—an illustration from an alabaster vase from Inanna's precinct at Uruk. (Photo: Hirmer Fotoarchiv München)



palace became separated from the enclosed temple precinct, and in fact this separation of temple and ruler appears in other ways as well. Thus, in the striking reforms of Urukagina of Lagash (discussed below) we see him returning rights and properties to the temples which his secular predecessors seem to have expropriated from them for their own use. Gilgamesh, the hero-king of Uruk, levied gangs of citizens to build the wall of Uruk and improve the Eanna, and he periodically brought gifts to his patroness Inanna. However, when she offered to marry him (as she had Dumuzi) he flatly, and most rudely, refused her, in the light of Dumuzi's gruesome demise. Perhaps this portrays the city-governor asserting his independence from the temple-estate.

The City Moves to Adulthood

It appears, however, that later in the Early Dynastic period the hegemony again passed to the south. Lagash, the chief city at the end of the Early Dynastic period, gives a fuller picture of life in an Early Dynastic city than any other. In addition to a host of royal dedications about building programs and victories over its archenemy, Umma, with which Lagash was constantly at war, there is preserved an archive from the temple-estate of Bau, consort of the patron deity of Lagash. The Russian Sumerologist Diakonoff has recently restudied this important archive with outstanding results. If we can believe his conclusions we must abandon our former picture of the temple-city as an absolute theocratic regime with little room for private or secular manipulation. He has shown that Lagash at the height of its power controlled about 1,160 square miles of irrigable land and had a population of about 100,000. He believes that only between a third and a half of this land was owned by the temple-estates. His evidence for who controlled the rest of the land, and how it was run, is drawn largely from sources other than those from Lagash, namely, contemporary and Akkadian sale contracts from northern Sumer. If these conditions do, in fact, apply to the half or two-thirds of Lagash not controlled by the temples, the following picture emerges of life in Lagash:

Over half of the land remaining was owned and farmed by large clans or patriarchal families formed into communities which were a part of the whole city-state and had some internal organization of their own. Those who did not belong to these large, loosely bound families were clients, given land for their own use on condition of service for the estates. Besides these two categories of citizens, an hereditary nobility owned large estates, worked by clients who received lands for their services. Both these and the temple clients can probably be divided into two groups, one of which is the prosperous administrative staff and chief artisans who

probably had much land under their control, and the other, the mass of farm workers who appear to have been given only rations of food and wool. Finally there are also slaves, working on the several different estates; they were generally captives from the many small intercity wars.

An important category of city dweller not covered by these documents (and known unfortunately only from later ones) is the merchant. We know that some temple workshops needed immense quantities of raw materials which had to be supplied by an extensive network of long-distance trade routes; and we know that this was a dangerous but lucrative business for a large class of people. But we know nothing about extra-temple workshops on the nobles' estates, or those run by the large landholding clans, nor do we know to what extent the merchant was really a free agent or worked for the temple-estates. We suspect that in subsequent periods merchants became so important to the urban economy that the cities' armies occasionally guaranteed their safety and protected mercantile interests.

Scribes associated with the estates left a better accounting of themselves than merchants; they kept extensive records for the estates, surveyed the land, laid out boundaries, transcribed and handed down myths and other literary texts, conducted the royal correspondences and wrote the royal dedications, etc.

We obtain an unusual insight into the social conditions of Lagash at the end of the Early Dynastic period (about 2350 B.C.) from a remarkable set of reforms by Urukagina, a late, and probably usurped, *ensi* of that city. He came to the rescue of the poor and oppressed, he returned the temple lands seized by his predecessors to their rightful owners. He abolished taxes and extortion and even added some measures of royal largesse: he awarded a bread and beer ration to certain classes of priests, craftsmen's guilds, some officials, blind laborers and some other workers. He also made laws to prevent higher officials from forcing the king's subjects to sell their property against their will. He amnestied debtors and protected orphans and widows and saw to it that the guilty were punished.

Unfortunately we do not know what lay behind these reforms, exactly what impelled a usurper to the throne of Lagash to return the secular lands to the temple. But this faintest ray of light does illuminate what must indeed have been a terrible situation in the city of Lagash. It shows Urukagina attempting for a moment to return the power balance to the *status quo* in the hope that some of the misery might be relieved. These reforms are the last gasp of the Sumerian city to maintain its particular

intricate balance between temple and private lands, between religious and secular power. Shortly after this, in about 2340 B.C., the whole area was overrun by Sargon of Akkad who drastically rearranged the social order and balance of power of all Mesopotamia.

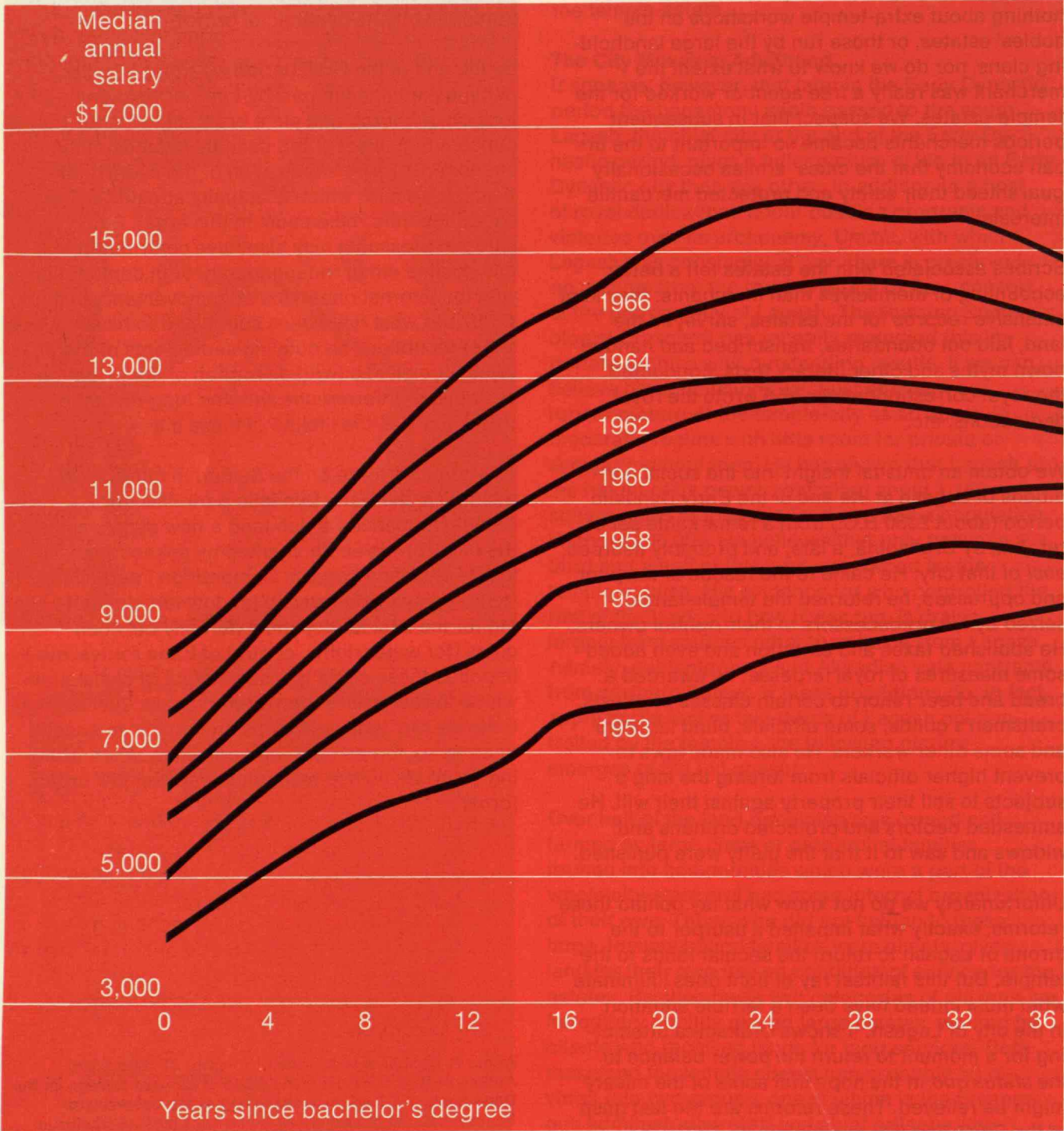
Surveying the development of the Sumerian city we have seen large temple-estates efficiently exploiting the subsistence base by well-organized irrigation and administration. But we have also noticed that, beginning at an early stage, there is a secular power competing in some sense with the temples. It is the tension of these two powers vying with each other for wealth and power that gives the Sumerian city its dynamic of growth.

By the end of the Uruk period we noted a cultural decline explained in part by *internal* weakening (the tension of church and state erupting, with possibly a concomitant upset of the delicate balance of the economic base by salinization of the overirrigated fields, a disaster which is actually attested at the end of the third millennium in this area). But *external* pressures may also have contributed to this decline either independently or in conjunction with the internal ones. Nomadic movements in the north and west have been suggested to have caused either incursions on outlying settlements of the urban complexes (with disruption of the irrigation systems) or interference with the long-distance trade that was the lifeline of these cities.

The nomadic force on the Sumerian cities is detectable in the Early Dynastic period as strong Semitic influences which lend a new dynamism to the cities of the south, marked by the accomplishments of Ur and Lagash. Competition internally (temple, royal, and private landowners competing for the best lands) and externally between cities (for water rights, control of trade routes, etc.) impelled these cities to a new height of civilization which further crises then altered again. Just as then, the city today develops and grows as a result of complex forces reacting upon each other, bringing on crises whose resolution leads to new urban forms.

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Engineers' salaries have nearly doubled since 1953 according to annual surveys by the Engineering Manpower Commission of Engineers Joint Council. In the same period salaries of production workers have risen by about two thirds and the consumer price index by one fifth; thus the increase in engineers' salaries represents a real jump in their value to their companies and bears witness to a shortage of engineering manpower today.



The Changing Profile of the Engineering Profession

In any profession as large and as diffuse as engineering, long-range trends are often submerged in a great deal of local turbulence. The individual engineer may face drastic changes in his career almost overnight. Thousands in the past decade have found their old skills rendered obsolete by the rapid pace of technological development. Others have been forced to change career directions by sudden shifts in corporate fortune or by massive re-deployments of government funds from one program to another. And to judge from what appears in the press, an unprecedented shortage of engineers in the spring may change to a surplus by fall.

On a more impersonal scale, the sniping between industry and the educators continues unabated. Employers complain that engineering schools are turning out theorists who can't go to work until the companies have trained or retrained them extensively (and expensively), while academicians charge industry with misuse of engineering talent and inability to appreciate the difference between an engineer and a technician. Within the educational community itself, the pendulum is pushed forward by the advocates of more science, then back by the proponents of more technology, then sideways by those who want more social sciences and humanities. Amid all the generators of noise, what signals can we identify to chart the course of the engineering profession?

Higher Salaries from Higher Demand

Looking at engineers en masse, I would say that several significant trends stand out beneath the short-term fluctuations. Some are fairly well documented; others are more speculative; some may be merely straws in the wind. The reason for my caution is, of course, that no one has yet succeeded in defining, let alone counting, the engineering "profession." The Bureau of the Census says that over one million people in the United States call themselves engineers, but the Department of Labor, using a different definition, reports 925,000. Educators point out that colleges have awarded only about 650,000 engineering

degrees in the last 40 years. The major engineering societies claim over half a million members, but overlapping and duplications bring this figure down to about 450,000 individuals. Advocates of registration deplore the fact that only about 220,000 individuals have availed themselves of a state license to practice engineering. Faced with such uncertainty as to the extent of our engineering universe, we must take pains to be sure that we are identifying trends, and not just differences of opinion or different definitions used in compiling statistics.

One trend about which there is no question is the rise in engineering salaries. As surveyed since 1953 by the Engineering Manpower Commission of Engineers Joint Council (of which I am now Executive Secretary), the salaries that employers report paying to people with engineering degrees have increased steadily for all levels of experience, although the increase has been greater for younger engineers than for older ones. On a median basis the 13-year increase has been 92.3 per cent (*see figure opposite*). By comparison the gross weekly earnings of production workers have gone up by 58.8 per cent and the consumer price index by 21 per cent. Clearly, then, neither inflation nor the general increase in productivity fully accounts for the rise in engineers' salaries.

To explain the additional increase, we have to postulate a higher demand for the services of engineers, either because their contribution to a company's prosperity is becoming more and more valuable, or because of a general shortage in numbers. In my opinion both factors are operating. The rapidly increasing dependence of all business enterprises on science and technology would tend to give the engineer more direct involvement in corporate success. Other indicators add credence to the existence of an engineering manpower shortage.

How can we measure a shortage or a surplus of engineers? The matter quickly bogs down in

Engineers' salaries have nearly doubled since 1953 according to annual surveys by the Engineering Manpower Commission of Engineers Joint Council. In the same period salaries of production workers have risen by about two thirds and the consumer price index by one fifth; thus the increase in engineering salaries is more than a real jump in their purchasing power.

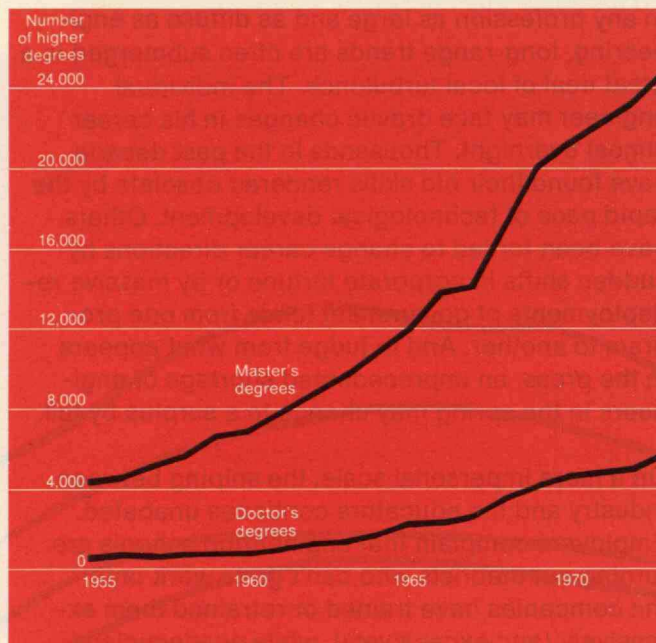
semantics and definitions. Many people claim that there would be plenty of engineers if employers would use them more effectively—giving them more clerical support, access to shared-time computers, better information retrieval facilities, etc.—and hire more technicians to do the standard and routine “handbook-type” work (although this last recommendation may be of limited practicality because trained engineering technicians are somewhat scarcer than engineers!). Personally I believe that the shortage is real but impossible to quantify precisely.

The continuing rise in the engineers' salary curve for the past 13 years is one reason for this belief. Another is the accelerating increase in starting salary offers to new graduates in engineering. The curve, which had been climbing steadily before 1965, took on a steep upward slope in that year. Activity of this sort clearly reflects more severe competition among employers for engineering talent, which could not happen if there were an excess of candidates for engineering jobs. However, the most fundamental reason for my belief in a shortage is the fact that, since 1945 or thereabouts, industry has had to employ as engineers an increasing number of people *who do not have a college degree*. Some commentators interpret this situation differently: many jobs, they say, are given an engineering title to provide prestige to the occupant, or to dazzle administrators awarding government contracts. While such reasons may explain some of the increase, they are superficial explanations at best. If industry is “upgrading” technician positions by giving them an engineering title, it is creating new technician jobs even faster, because the growth in engineering technician employment in recent years seems to be greater than that in engineering.

Changing Concepts in Engineering Education

It is my belief that we are witnessing a change in the educational concept of engineering, while industry is continuing to define engineering jobs by the standards of 20 or more years ago. At that time

Value of postgraduate work is being increasingly recognized by engineering students. Today, a quarter of all graduating engineers go directly to graduate school, and many engineers are returning to school several years after graduation or are studying for higher degrees at night school (below). Figures beyond 1966 are projections. Employers also recognize the value of higher education, and reward it through financial incentives (opposite).



graduate engineers *were* expected to perform tasks that we now regard as technicians' work. Today industry recognizes that less educated people are fully capable of performing certain tasks that used to be a basic part of the engineer's job. Most of my contemporaries were exposed to such “practical” subjects as shop practice, mechanical drawing, surveying, and chemical pilot plant operation. A generation ago these topics were more of an art than they are today, and their practice had not been standardized to the extent we see now. But while engineering education was changing the character of the graduate engineer, and practicing engineers were quietly revolutionizing the basic methods and practices of industry, job descriptions remained static. Industry has continued to define engineering as it used to be rather than as what it is becoming. The gap—a steadily growing one—is being filled by people who, though they are called engineers and are doing work that was a respectable function of engineering not too long ago, do not need today's engineering education to perform such tasks entirely satisfactorily.

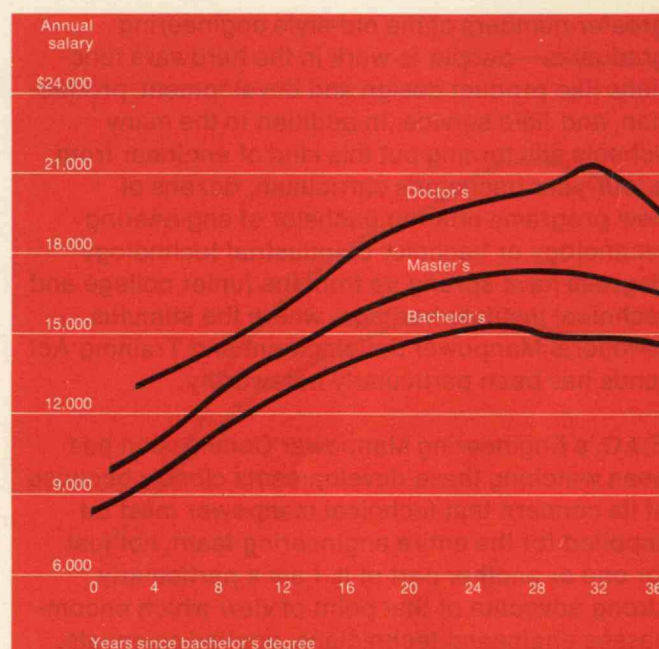
This change would not have happened if industry had been able to fill all its "engineering" jobs with graduate engineers. But the supply simply was never up to the demand. Recognizing necessity as the mother of invention, industry adapted itself to the manpower shortage by applying the very basic principles of subdivision of labor, and demonstrated the existence of a shortage by devising a substitute for the engineers it was unable to hire directly.

There are other ways of measuring the demand for engineers. The Department of Labor projected the over-all growth of each sector of industry, applied ratios of engineers to other employees, and forecasted a 58 per cent increase in the demand for engineers: from 924,900 in 1963 to 1,466,500 in 1975. This was equivalent to an average of 45,000 new engineers per year. The Engineering Manpower Commission asked a large sample of employers to indicate how many engineering graduates they expected to hire, and weighted the responses to arrive at a national estimate. This showed an average requirement for 69,000 new engineers annually from 1965 to 1976.

The difference between the two figures is, in fact, academic, because there is no possibility that enough engineers will graduate to meet *either* projection. E.M.C. estimates that an average of no more than 41,000 new graduates can be expected over the next decade. (There were about 36,000 in 1966 and 1967. Note that master's and doctor's degrees cannot be counted as new additions to the engineering force, as their recipients were taken into account when they received the baccalaureate.) Thus it seems reasonable to predict a continuing "shortage" of engineers and a continuation of the pressure for adaptation and change that has characterized the profession in recent years.

Just as the chronic shortage of technical manpower has influenced the use of engineers, so the phenomenal expansion of all fields of knowledge has forced changes in engineering education. Despite constant efforts to trim the curriculum of outdated or marginally relevant material, the duration of an education in engineering has gradually but inexorably increased. Many deans of engineering concede that the average student in a nominal four-year curriculum actually requires about 4.7 years to earn his first degree. This fact is being recognized increasingly by the establishment of formal five-year engineering programs.

As curricula have become both longer and more concentrated at the baccalaureate level, more and more students have recognized the need for—or at least the advantage of having—advanced



degrees. According to current Engineering Manpower Commission surveys, at least 25 per cent of all new bachelor's degree graduates are going *directly* on to higher education. At the same time, more and more engineers are returning to school after several years of employment, or are picking up a master's degree by evening study (see *figure opposite*).

Another way in which the educational system is adjusting to the pressure of the expansion of knowledge is indicated in the Goals of Engineering Education preliminary and interim reports, published by the American Society for Engineering Education in October, 1965, and April, 1967. The reports recommend that engineering schools move toward adopting a five-year curriculum leading to a master's degree in engineering as the norm for the future.

As the education of what we might loosely call the full-fledged professional engineer has lengthened, and its product has become more science- and theory-oriented, industry has continued to demand

greater numbers of the old-style engineering graduates—people to work in the hardware functions like product design and development, production, and field service. In addition to the many schools still turning out this kind of engineer from a four-year bachelor's curriculum, dozens of new programs offering bachelor of engineering technology or bachelor of industrial technology degrees have sprung up from the junior college and technical institute heritage, where the stimulus of federal Manpower Development and Training Act funds has been particularly noteworthy.

E.J.C.'s Engineering Manpower Commission has been watching these developments closely because of its concern that technical manpower must be supplied for the entire engineering team, not just for one or another part of it. I am a particularly strong advocate of that point of view which encompasses engineers, technicians, applied scientists, and technologists within an engineering *community*, rather than seeing engineering as a profession in the restrictive sense. I can think of no more harmful division in engineering than a dispersion of the engineering team into squabbling factions over the superficial issue of who is or is not a professional.

Engineers as Executives

Another noticeable trend is the increasing employment of engineers in management and executive positions. This can be viewed from two angles: students of the field of management have looked at managers in general and have found that engineers are making up an increasing proportion of their ranks, while engineering groups, looking at the functions performed by engineers, have observed that more and more engineers are serving in management, administrative, and supervisory capacities.

While there is obviously a relationship between these two points of view, I think that they indicate two separate trends. That seen by the professional managers can be interpreted as stemming from

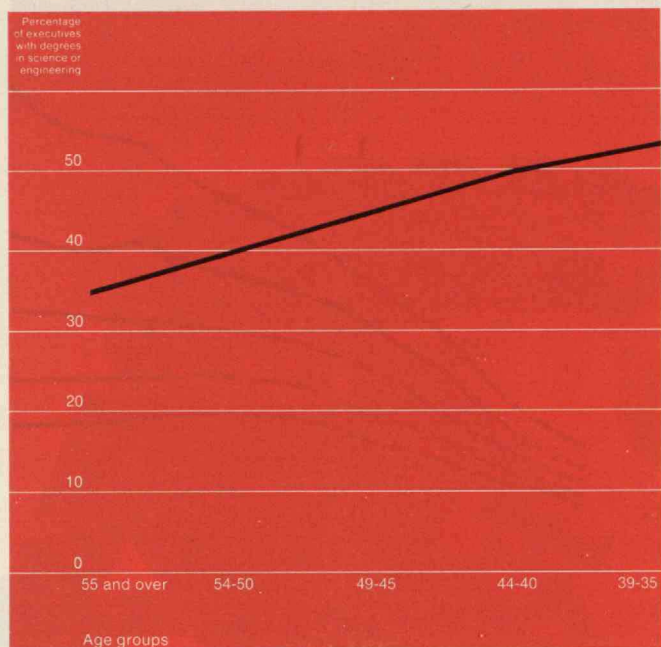
the increasing technological nature of our entire society and of industry in particular. The task of understanding and directing organizations with a growing involvement in technology can best be performed by people who have a background of education and experience in science and technology. Thus the director of engineering is now seen as a prime candidate for high corporate office, whereas in the past a background in sales or finance might have seemed more pertinent.

From the engineering point of view, management is a logical extension of the engineer's function of designing, developing, and producing products, services, and systems in which the laws of nature, raw materials, energy, and manpower are metamorphosed for the use of mankind. If we accept this master role of the engineer as a designer-synthesizer and innovator—as does every definition of engineering with which I am familiar—it is clear that managing and directing the work of others to accomplish these ends is as much true engineering as is their accomplishment by one man alone. In fact, it is practically impossible today for a single individual to carry out the entire engineering process unless he restricts himself to very simple products. But since the world is growing more complex technologically, and the body of scientific knowledge has expanded far beyond the capacity of a single brain, projects of any real consequence inevitably exceed the capacity of an individual engineer. To accomplish engineering tasks of major significance, then, the engineer must step into the role of manager.

Much of the criticism directed at the engineering community today stems from the reluctance of many engineers to come to grips with the problem of technological leadership. Because engineers have so often failed to consider the social implications of their creations, nonengineers have stepped in and made the key decisions. But it is the engineers who are blamed for such consequences of technology as highway routing, city congestion, automation, environmental pollution, noise, and any number of other problem areas. The engineering community is finding to its sorrow that abdicating the responsibility for making socio-technological decisions does not absolve it from blame for the consequences of those decisions. Yet today one still hears engineers express the opinion that an engineer has "dropped out of the profession" because he has moved into management, has taken a "political" job in government, or has gone into some position where decisions must be made on other than purely technical grounds.

A Harvard study (*see figure opposite*) shows that more and more young engineers are going into management positions. The younger the age

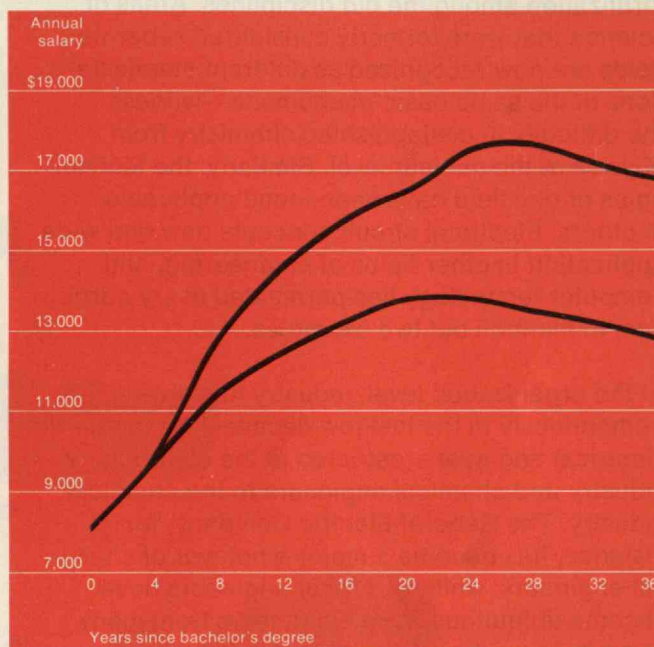
Management positions are rapidly opening up to engineers according to a survey of 6,000 executives in industry by the Harvard Graduate School of Public Administration (left). Younger engineers show particular readiness to step into management roles. The step carries an immediate salary advantage over the orthodox engineer, which increases with the engineer's experience as an executive. Upper curve at right shows salaries of supervisors; lower curve those of non-supervisors.



group of managers studied the greater the percentage of engineers in it. This undoubtedly indicates a basic trend which is gradually changing the profile of the engineering profession.

Engineers' salaries show quite plainly the results of the pressures I have been discussing. The figure on page 39 dramatically illustrates the premium of higher education in terms of hard cash. Spokesmen for industry may decry the lengthening curricula and lament the lack of dirty-hands engineers, but they pay a good deal more for a year or two of advanced education than they do for the equivalent amount of on-the-job experience.

The premium on new knowledge is demonstrated by the sharp rise in starting salaries as compared with those for experienced engineers. Whereas engineering salaries at the median point—about 12 years after graduation—have increased at the rate of approximately 4.5 per cent per year, starting salary offers are going up by about 7 per cent annually, and the increase in the last two years was steeper than ever before.



Finally, the figure above shows the financial advantage of a supervisory position. For all the talk about "dual ladders" of advancement and the castigation of management jobs as not real engineering, it is clear that employers are putting their money behind the supervisory group.

Ecumenical Movement in Engineering

One other trend emerges from the salary statistics which might be described as an ecumenical movement in engineering. There used to be significant differences between the salaries in various fields of engineering. Now, although some differences remain, they are becoming submerged in other trends. Over the last few years starting salaries have tended to equalize for the major curricula.

I believe that two factors underlie this trend. One is the increasing prevalence of "common core" courses in all engineering curricula. To a limited extent this tends to make graduates less specialized and more versatile, hence more interchangeable. There has also been a great deal of cross-

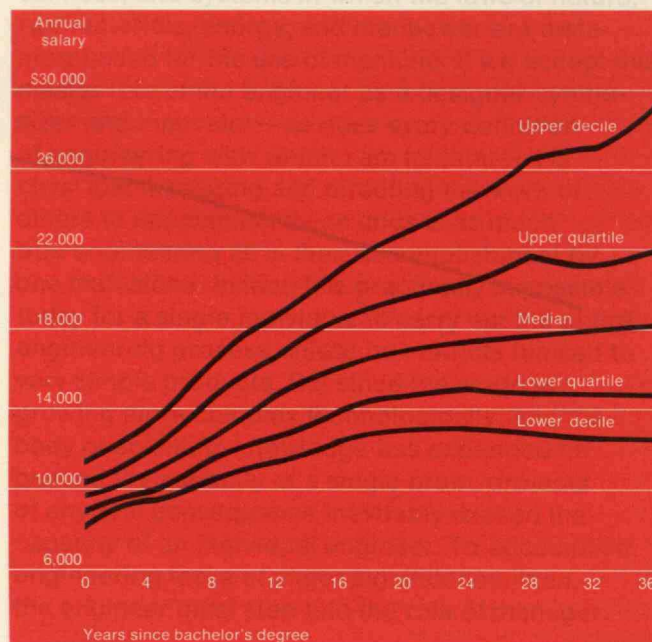
Individual achievement remains the fundamental factor which determines an engineer's salary throughout his career. Ability, performance and professional growth, rather than differences in curriculum or region, have the most effect on the engineer's earning potential.

From the engineering point of view, management is a logical extension of the engineer's function of designing, developing, and producing products, services, and systems in which the laws of nature

fertilization among the old disciplines. Areas of science that were formerly considered separate fields are now recognized as different manifestations of the same basic phenomena—witness the difficulty in distinguishing chemistry from physics at the nuclear level. Similarly, the technologies of one field have been found applicable in others. Electrical circuit concepts now find wide application in other fields of engineering, and computer technology has permeated every curriculum, to mention but two examples.

At the organization level, industry has diversified tremendously in the last few decades. No longer are electrical engineers restricted to the electrical industry and chemical engineers to the chemical industry. The General Electric Company, for instance, has become a major employer of chemical engineers, while electrical engineers have become ubiquitous. When engineers from many disciplines work side by side on the same team, it is no longer possible to maintain the salary differentials of the past. The competition for first-rate engineers has spread beyond the limits of traditional industry and disciplinary boundaries. Even regional differences seem to be losing their significance as the favorable employment climate enables many engineers to move freely between industries and regions. The result is a trend towards equal salaries over all branches of engineering.

The one traditional characteristic of engineering that our salary curves still bring out strongly is the importance of individual achievement. No matter how we have sliced our salary data—by industry, region, highest academic degree, or supervisory status—we have come up with a great range of salaries for individuals whose situations are otherwise comparable. The figure above shows a typical set of curves of the median, quartiles, and deciles of salary scales as a function of years since graduation with a baccalaureate. Eighty per cent of all engineers' salaries reported fall within the upper and lower of these curves. The



separation between them, amounting to several thousand dollars per year at practically every point on the chart, is mostly a reflection of individual differences in the ability, performance, and professional growth of the people concerned.

My conclusion is that the profile of the engineering profession is indeed changing, and in ways that are reflected in its salary patterns. What remains unchanged is the variability of work that is encompassed in the term "engineering" or is done by people with an engineering education. This diversity of professional opportunity is matched by a variability in material reward, and I think that most engineers would not have it otherwise.

John D. Alden, '49, is the Director of Manpower Activities of Engineers Joint Council, and serves as Executive Secretary of the Engineering Manpower Commission and Director of the National Engineers Register. He spent 22 years in the U.S. Navy, retiring in 1965 with the rank of Commander. Mr. Alden has bachelor's degrees from both Cornell and M.I.T.

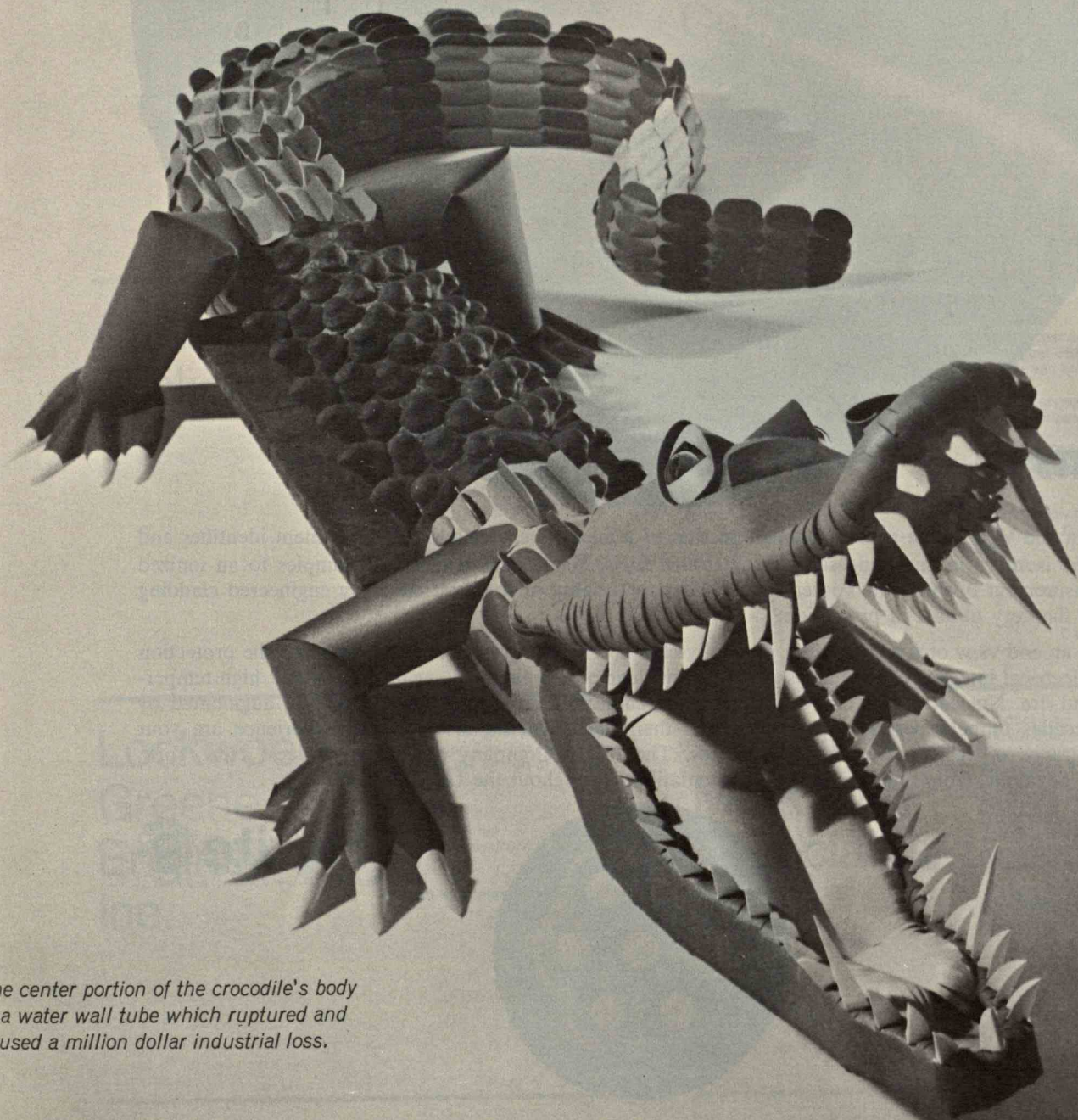
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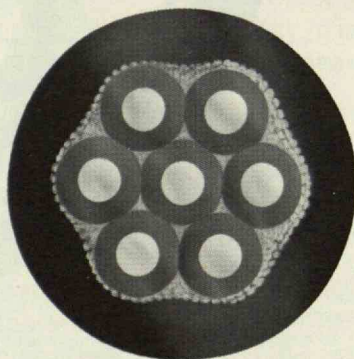
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Trend of Affairs

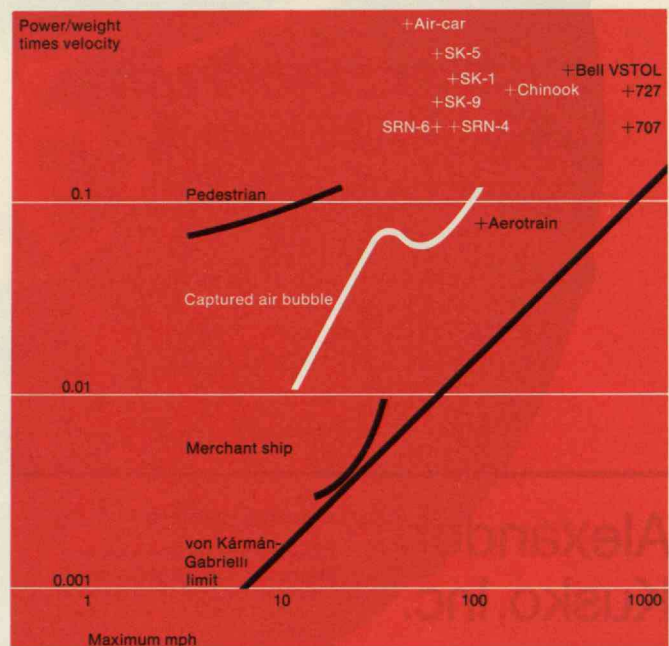
Transport Tomorrow

"Today man can move at speeds which are thousands of times greater than at the beginning of history, while within our cities he actually moves at approximately the same speed as thousands of years ago." This comment, by Constantinos A. Doxiadis, President of the Athens firm of Doxiadis Associates International, posed the essential problem under consideration in a series of eight interdisciplinary symposia on "Man and Transportation" at the meeting of the American Association for the Advancement of Science in New York in December. Transportation issues as diverse as long-lasting paint for road signs and personalized VTOL aircraft engaged the attention of some 30 participants and their audiences.

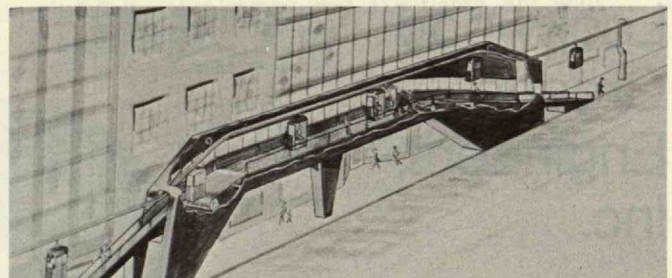
Who is to take responsibility for designing and developing futuristic schemes of urban and interurban transport? William W. Seifert, Sc.D.'51, Assistant Dean of the School of Engineering at M.I.T., suggested industrial co-operation on the lines of the Communications Satellite Corporation or the supersonic transport as a model for private enterprise interests hoping to retain the initiative in transportation. If industry fails to respond to the need for better transportation systems, Dean Seifert warned, the federal government may permanently preempt options in this area.

Where are the major gaps in urban transit technology that any potential developer must attempt to fill? New equipment is obviously a large factor in transit technology, but, in the view of Kaj L. Nielsen of the Batelle Memorial Institute in Columbus, Ohio, the demand for good management and operations overshadows this problem. "Even if the most advanced hardware systems are implemented," said Dr. Nielsen, "the need for good management and operations would still exist, and the complexities of the new systems might very well aggravate the problems of management." In addition to attracting more graduates into the transport field, transit enterprises must support their staffs more adequately by developing better models and techniques for management decision processes.

As is usual in such sessions, ideas for new transport hardware flowed in abundance. In this case, some of it was even applicable to present-day needs. For example, Henry A. Barnes, Traffic Commissioner of the city of New York, cited a number of simple techniques now being used to keep traffic in that city moving—even though it may not travel very fast. One-way streets, a strict tow-away program, quick-drying, long-lasting marking paints for roads and radio-controlled traffic signals, which will eventually mesh into an electronic network, are all helping to relieve traffic congestion.



Helicopters and ground-effect vehicles share the distinction of being least terrain-dependent of modern means of transportation. The von Karman-Gabrielli curve (above) shows that, compared to the helicopter, current ground-effect machines have lower power requirements per unit weight by a ratio of approximately one to two. However, the speeds compare in approximately the reverse ratio. Thus, as between these two "terrain-independent" vehicles, there is comparable transport efficiency "even at this early stage of ground-effect machine development," Arnold F. Kossar, '51, Vice President of Engineering at Curtiss-Wright Corporation, told the American Association for the Advancement of Science.



Continuous system for urban travel, designed by William H. Avery of The Johns Hopkins University, consists of series of two-passenger cars supported on an elevated rail and pulled by cables at about 20 miles per hour. At stations, cars are disengaged from the cables and slowed to match the speed of a moving sidewalk, allowing passengers to enter and leave.

Science vs. Crime

The day after a prominent politician was shot in the leg in Chicago, Mayor Richard J. Daley announced that he would strengthen city police forces to a number sufficient to ensure that such acts of violence would not occur. This reaction—reacting more to deter crime than to prevent it—is understandable and often effective in the fight against crime. But in the fight against crime, the police should not be the only ones to respond. In the fight against crime, the police should not be the only ones to respond. In the fight against crime, the police should not be the only ones to respond.

Still in the present, Aaron J. Gellman, '58, Vice President, Planning, the Budd Company, spoke of the contribution of rail transport to urban and inter-urban travel. Passenger service has the potential, he said, of solving the problem of accessibility of the underprivileged to job markets, while containerized freight service should bridge the gap between coastal cities and hinterlands, and perhaps introduce overhead service between water or air carriers operating to and from coastal points.

A flexible product of modern transport technology is the ground-effect machine, exemplified by the hovercraft, which already carries passengers across the English Channel. Arnold F. Kossar, '51, Vice President for Engineering of the Curtiss-Wright Corporation, suggested that extended use of these vehicles as ferries for passengers, trucks and cars in coastal and limited open-water operations is close at hand. Ground-effect machines appear to have particular relevance to the transport needs of underdeveloped areas, which do not have ready-prepared networks of rails, highways and bridges.

Moving further into the future, William H. Avery of The Johns Hopkins University outlined an inexpensive scheme for urban and inter-urban travel. The basis of the system is a series of small, two-passenger cars supported on an elevated rail and pulled continuously by an enclosed cable. Cars entering a station area are disengaged from the cable and decelerated to a speed matching that of a moving sidewalk, which carries passengers entering and leaving the cars. Cars would travel at about 20 miles per hour on the rail and slow to 5 to 10 miles per hour in stations. The system would consist of a series of loop lines arranged in a grid in such a way that no passenger is ever more than three blocks from a station. To speed up transit between distant points in the metropolis, the grid system would be supported by an underground Gravity Vacuum Transit system, which would whisk passengers between stations five miles apart at speeds up to 275 miles per hour. The aerial car system is, in fact, already within the state of the art, and a demonstration of it should, according to Dr. Avery, be possible within a year's time.

Even private vehicles will have to fit neatly into urban transit systems in the near future. Richard H. Shackson, Principal Engineer of the Transportation Sciences Department at Ford Motor Company, forecast that semi-automatic highway systems would be widely implemented in the coming decade, and that by 1972 cars will have some computing ability built into them.

Finally, to add the touch of science fiction which may unexpectedly become science fact, H. G. Edler of the National Aeronautics and Space Council looked at the third dimension of urban travel—use of the air. He suggested how the commuter of 1999 might use a computer-controlled vertical takeoff and landing vehicle with an inherent capacity to avoid mid-air collisions. In the central city these craft could home into buildings with rooftop landing and vast parking capacity; these storage buildings could be located so frequently that no commuter would have more than a three-block walk.

Academic Computer

The digital computer's unprecedented inroads into American life have their counterpart on the college campus. In his 1967 annual report, Gordon S. Brown, '31, Dean of the M.I.T. School of Engineering, writes that no other modern technological development "threatens to alter the established order of the academic community more than the high-speed digital computer. The impact of the computer on all domains of campus life—its cost of operation, its penetration into the conduct of the teaching-learning process, its relation to the character of curriculum content, and the problem of its operation as an efficient service facility—all appear to have been underestimated."

Dean Brown's report includes an inventory of M.I.T.'s impressive facilities, which, he says, include "the most sophisticated time-sharing computer systems in existence anywhere." As he points out in the report, "nearly every student at M.I.T. now gains personal experience with use of a computer at some time or other in his program of studies. . . . To meet their growing expectations, we must find ways to reduce the cost."

While M.I.T. works to co-ordinate its many computers efficiently (see Technology Review Nov., 1967, p. 67), other educational institutions throughout the U.S. are anticipating interuniversity links to add strength and versatility to their computer resources. For example, John F. Lubin, S.M.'49, Director of Computing Activities at the University of Pennsylvania, recently announced the installation of an I.B.M. System/360-Model 65 complex in his department; this represents the start of a regional computing utility to serve the needs of the academic and scientific community of the Delaware Valley.

Oldest of the interuniversity computer links is the Western Data Processing Center at the University of California (Los Angeles) with direct lines to 15 university campuses in the West. Computers at Duke University, the University of North Carolina, and North Carolina State College have been formed into the "Research Triangle" network. Many others are planned, the most ambitious of which is EDUNET, a coast-to-coast interuniversity information network devised by a special study group called the Interuniversity Communications Council.

Computers are making their way to the junior college as well. In a new report from Pasadena City College, Frank A. Yett, '40, Chairman of the College's Department of Computer Sciences, writes that "the two-year community college's diversified curricula must necessarily make use of computer-assisted learning techniques." All three of the college's student groups need them, writes Dr. Lett—those who will later transfer to four-year colleges to meet the standards there, those in terminal programs to help "adapt the basic skills of 'reading, writing, and arithmetic' to their vocational programs," and those in adult education activities to enable them to find, on their own schedules, programs to meet the wide background of experience, ability, and skill which they bring to their work in the community colleges.

Dr. Yett's Center for Computer Assisted Learning at Pasadena City College has already developed two programs for instruction directly from the computer system operating in the time-sharing mode. INQUIR teaches a simple language for information retrieval and provides a model data base with which students practice computer skills. M.A.T.H. (Modern Arithmetic Teacher's Helper) is the first of a lesson series in mathematics. By 1971, writes Dr. Yett, a computing system big enough to meet the College's needs will require a budget of \$450,000—\$50 per student, 4 per cent of the school's total expenses. But interviews conducted by Dr. Yett's Center elicit "uniformly high praise" for computers as teachers. "The computer is, in the view of those enrolled, a consistent, patient and discreet tutor," he writes.

D.N.A. Drama

The production of synthetic, biologically active DNA announced last December is undoubtedly a remarkable scientific achievement. Just as remarkable, however, was the way the announcement of this achievement was handled by the National Institutes of Health and the National Science Foundation, the two agencies funding the Stanford group of Nobelist Dr. Arthur Kornberg which carried out the work.

Despite the fanfare, the synthesis of the biologically active DNA by Dr. Kornberg and Dr. Mehran Goulian, now of the University of Chicago, was really the latest of a series of experiments in producing DNA synthetically which date back beyond the original production of biologically inactive DNA by Dr. Kornberg, the achievement which won him the Nobel prize. An important landmark in the work was the discovery in 1959 by Robert L. Sinsheimer, '41, of California Institute of Technology, of the particular form of DNA used by the Stanford group. Known as Phi X 174, this simple



Electron micrograph of biologically active D.N.A., synthesized in the test tube by scientists at Stanford University School of Medicine. This form of D.N.A.—Phi X 174—is unusual in that it contains only one circular strand rather than the two helically intertwined strands of more common types of D.N.A.; Phi X 174 was discovered by Robert L. Sinsheimer, '41, who tested the Stanford group's synthetic D.N.A. for biological activity. Diameter of a typical ring of the virus is about two microns.

virus contains only one circular strand rather than the normal two joined in a helical fashion. Dr. Sinsheimer himself tested Stanford's synthetic DNA and confirmed its biological activity.

The Stanford group's feat received such widespread publicity largely because of the present attitude of many members of Congress, who appear ready to sacrifice basic research to the current climate of economy. According to *Science*, the two funding agencies saw the work of Dr. Kornberg's group as an opportunity to inform the American public of a concrete result of their investment in basic health research. And at his press conference Dr. Kornberg stressed the possible applications of his group's work in controlling cancer and modifying genes to cure hereditary defects. The entire episode, in fact, suggests that the basic scientists and their supporting agencies are now beginning to face the realities of obtaining money and forming their own type of lobby to that purpose.

Science vs. Crime

The day after a prominent alderman was shot in the leg in Chicago, Mayor Richard J. Daley announced that he would strengthen the city's police force to a number sufficient to ensure that such acts of violence could not occur. This reaction—recruit more police to deter increasing lawlessness—is understandable and often echoed by the layman. But in the view of many experts in criminalistics, it is hardly a rational response in the fight against crime. Instead, they say, police administrations should aim to streamline their organizations in the most efficient manner using the tools that technology and social science provide.

The application of science and technology to the administration of criminal justice formed the subject of a series of six sessions at last December's annual meeting of the American Association for the Advancement of Science in New York. The general feeling of the symposium was that the police are extremely slow to recruit natural and social science in the fight against crime. Alexander Joseph of the City University of New York noted that 17 states possess no crime laboratory whatever and that only a small fraction of police personnel employed in crime laboratories possess even bachelor's degrees.

Paul L. Kirk, of the University of California at Berkeley, called for development of criminalistics as a true academic discipline; at present many administrators believe that it is only necessary to hire a chemist to perform chemical operations in the crime laboratory, a serologist to do blood grouping and precipitin tests, a spectrographer to operate advanced instruments and a gun hobbyist to identify firearms. But it is only a qualified criminalist who can pull together all these strands of a scientific investigation and obtain correct perspective.

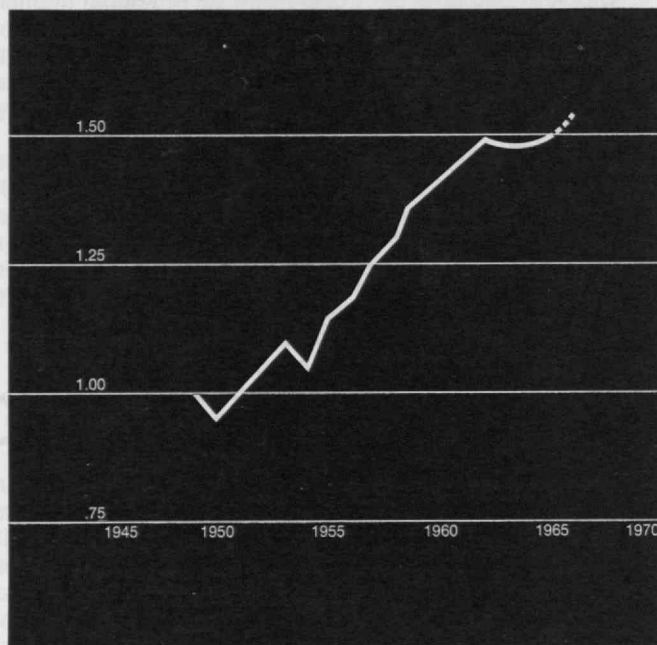
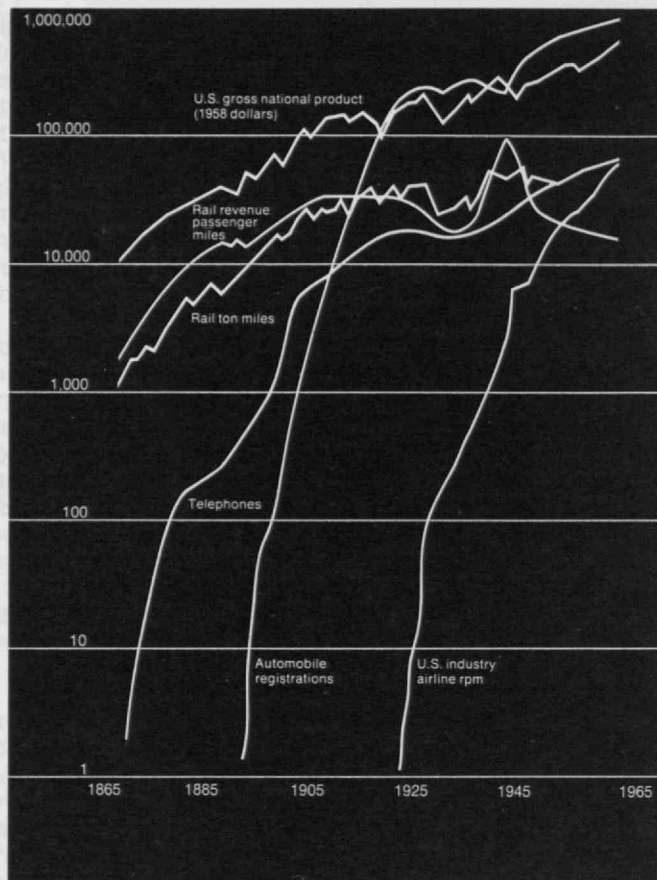
The program did contain a few bright spots to suggest that some police forces are realizing how technology can assist them in their endeavors. The state of New York, for instance, has for two and a half years operated an Identification and Intelligence System (N.Y.S.I.I.S.) carrying out research and development projects aimed at adapting selected types of information for computer handling. Charles R. Kingston of N.Y.S.I.I.S. reported on a project to develop an automated fingerprint processing system which "will provide police with a tremendously increased capability for identifying a criminal who has left a latent fingerprint impression at a crime scene." The system is also involved in initial studies to determine how a computerized information system can assist the crime laboratories in their scientific examination of physical evidence.

Another piece of technology on the verge of acceptance in the halls of justice is the production of voiceprints—visual representations of speech. According to Cecil R. Frost of Communications and Systems, Inc., voiceprints, which represent speech in two dimensions by displaying amplitude and frequency versus time, will eventually be capable of an error rate as low as one in 50,000—quite close to the likely error rate of fingerprinting classification. In addition to the plain task of identifying voices, there is evidence that expert evaluation of voiceprints and related tape recordings can provide some indications of the sex, occupation, age, height, weight and personality of an unknown speaker.

It is mainly in the area of social science that the police have so far neglected the experts. A number of authors spoke scathingly of police attitudes to Negroes, both in everyday life and during big-city riots, and it was clear that most police forces have little time for anthropologists' views on dealing with minority groups.

Perhaps more surprisingly, police are also loath to embrace the techniques of social science in dealing with their own use of manpower. As a result, the occasional surveys on the use of police resources often show up surprising inefficiencies. Gordon Misner and Richard B. Hoffman of the University of California and Robert Riggs of the Planning Resource Corporation reported two surveys—one on the use of manpower and the other on the economics of police activities—which illustrated that police departments are far behind the times in management. Possibly, commented Mr. Riggs, this results from the lack of graduates in police departments (itself arising from police insistence on apprenticeship on the beat) and the absence of management training programs in police systems.

Unfortunately, even among the experts there is little agreement over what the police should do to utilize science and technology. Participants in a panel discussion concluding the symposium agreed that the police must do something along these lines to arrest the burgeoning crime rate, but specific examples of just where science could come in handy were notably absent.



Transition of an expanding industry to a mature industry making less spectacular progress occurs as the industry's rate of growth tapers off to match that of the Gross National Product. Growth curves for railroads, cars and telephones illustrate this maturing process (top). The growth rate for the airline industry, however, continues to increase as technological improvements simultaneously lower unit costs and upgrade quality. To help their forecasts of future growth in the industry, Boeing's forecasters have devised a composite quality index. Despite a trough in the early 1960's caused by increased fares, this index continues to increase (bottom), suggesting that the industry's growth is assured for some years to come.

Forecasting Flying

When Boeing Company decided to produce the 707 in 1952, it did so with seat-of-the-pants intuition that an aircraft of the 707's quality and characteristics would automatically have a market, rather than with the scientific backing of market analyses and forecasts. Today, however, forecasting the future growth of air transport plays an important role in the decisions of aircraft companies to develop new models. Harry A. Carter, S.M.'42, Director of Planning at the Boeing Company, described the problems of forecasting air transport at a seminar organized by M.I.T.'s Department of Aeronautics and Astronautics in January.

The major difficulty in forecasting the expansion of a growth industry (defined by a growth rate well in excess of that of the gross national product) is to determine when its rate of growth will level off to match the G.N.P. (see chart upper left). Continued growth depends on both lower unit costs of a product and improvements in quality, in the context of an expanding economy; the forecaster must therefore aim to quantify the quality of his product.

Boeing's forecasters have derived what they call a composite quality index for airline services (see chart lower left). This represents a mixture of improvements in aircraft technology—speed, passenger space, pressurization, type of aircraft and availability of nonstop flights—and service factors—safety, frequency of departures and service to passengers. The forecasters substitute this index into an equation they derived to obtain the ratio of passenger revenue miles to gross national product.

Studies of the growth in air travel since it started show a decrease in growth rate every 10 years or so until the advent of substantial innovation, such as that provided by jets in the late 1950's. In spite of an unexpected dip in growth rate in the early 1960's, probably caused by an increase in cost per passenger mile, forecasts suggest that the air travel industry will certainly retain its momentum, particularly with jumbo jets and supersonic transports just around the corner. However, Mr. Carter warned that analytical forecasting for the industry is in a very early stage as a science at present. "We have a long way to go," he said, "before we have a mathematical equation that can describe the aircraft industry."

Systems for People

Can the systems engineering approach to large-scale research and development enterprises which created America's modern weapons systems also be applied to solve our urban problems? And if it is, can we devise institutional arrangements within the community so that the large-scale changes which will follow are achieved within the context of a dynamic democratic society?

General Bernard A. Schriever, formerly Commander of the Air Force Systems Command and now retired from active duty, is among the advocates of the systems approach to urban problems. Like weapons systems, he told a recent seminar of the M.I.T. Club of Washington, the urban problem is made up of many complex elements; indeed, it is "more complex by an order of magnitude" than anything that has been done by the military, he said. No one has yet addressed the questions of how housing, crime prevention, education, transportation, and opportunity relate into a total urban system, but "the climate is right for constructive business participation in such systems research," he said. The problem now is to see what American industry's experience in exploiting advanced technology through complex systems really has to offer and how that backlog of know-how can be brought to bear.

James L. Morey, Executive Director of Urban Planning Aid, Inc., of Cambridge, agrees; it is clear that engineering skills, broadly defined, have a great deal to contribute, he told a recent faculty seminar at M.I.T. But he emphasized the dilemma of how to relate community self-improvement and self-government to engineering skills. For example, he said—with a clear if unspoken reference to the city of Cambridge's struggles with proposals for an "Inner Belt" highway—there is no device for public review of a total area transportation system; we can review only one element of it which lies within a particular political unit. We must always recognize the need, he told the faculty, "for very close local community participation on utilizing the results of engineering skills which have been applied through research and development."

Oceanic Priorities

What man knows about the oceans is sufficient more to reveal what he does not know than to prove what he will gain from the greater knowledge he seeks. And, facing this uncertainty, the scientist's dilemma is what to work on first.

There are "serious difficulties on priorities," said Robert M. White, Sc.D. '50, Administrator of the U. S. Environmental Science Services Administration, at an oceanography session of the American Association for the Advancement of Science in mid winter. Our first need is to maintain accurate charts for navigation, and to this task we must now commit "a good fraction of our marine exploration capability," according to Dr. White. For resource development, we need to explore in great detail the continental shelves; for national defense, "a comprehensive ocean exploration effort to provide bathymetric, topographic, and geophysical information"; for scientific understanding and for their ultimate human usefulness, systematic exploration of

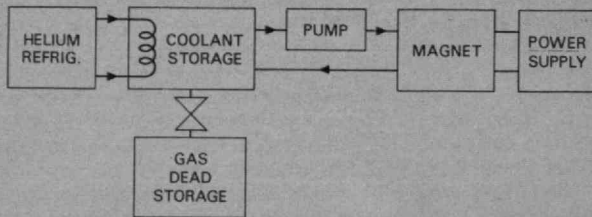
the abyssal seas. But most of all, he believes we need understanding of the oceans as the environment of earth's weather and better understanding of the oceans as an element in the earth's dynamical physical system; and in this case, said Dr. White, the knowledge we need may not be so far beyond our grasp. Geophysical fluid dynamicists, who are developing mathematical models for the interaction of ocean and atmospheric systems and the effects of bottom topography on ocean movements, are providing an essential framework for this knowledge.

These models, said Dr. White, will demonstrate the data which we need to define the geophysical system, and they will provide "a rational means of judging the consequences of man's interference with natural processes."

"The nations of the present world stand entranced" by the sea much as the nations of Sixteenth Century Europe viewed the New World with rumors of "immense treasure and riches." Will increasing oceanographic knowledge fulfill these visions? John H. Ryther, Chairman of the Department of Biology at the Woods Hole Oceanographic Institution, gave one tiny look through the keyhole: in the Philippines, three-dimensional hanging culture techniques could yield more than 10 tons of oysters and 100 tons of mussels per acre per year. The 1¼ million acres of Philippine mangrove swamps could, if properly cultivated, produce an annual crop of milkfish, a local food fish, nearly equal to the total fish landings of the U. S. Since 1948, said George K. Parman, of the Agency for International Development, world production of marine organisms has increased from 19.6 million to 52.4 million metric tons.

New manpower to realize these visions will not be a serious problem. The number of graduate students in oceanography is now growing at about 18 per cent per year—doubling every 4¼ years, according to Robert B. Abel, Head of the National Science Foundation's Office of Sea Grant Programs. There may be some increasing attrition, however, because the graduate student in oceanography has special problems: on the average he takes longer than most other science students to earn his Ph.D.; because of this he is likely to be married and raising a family, but his graduate work requires that he spend time at sea, away from home; the need to be at sea prevents him from holding a part-time job while studying; there are few undergraduate oceanography courses, so few opportunities for help with teaching or laboratory work; and there is always the problem of seasickness.

GENERAL LAYOUT OF THE MAGNET SYSTEM



Cryogenic magnet designed by Richard Stevenson, Sc.D.'57, at McGill University will attain a magnetic field equal to the highest produced at M.I.T.'s Francis Bitter National Magnet Laboratory, using only a fraction of the power required by the M.I.T. device. Production of a maximum field of 250,000 gauss at an expenditure of only 10 kilowatts of power results from exposure of the magnet's specially designed solenoid system, part of which is superconducting, to temperatures between -445° and -427° F. The helium refrigerator will produce high-pressure helium at such temperatures which will circulate through the magnet assembly.

Low-Power Magnet

The largest magnet in the National Magnet Laboratory at M.I.T. is about to be challenged at McGill University, and the man in charge of the project is an alumnus of M.I.T.

The Montreal institution is building, at an estimated total cost of \$1 million, a low-temperature magnet system with a pull more than a million times that of the earth. Richard Stevenson, Sc.D. '57, who is now Associate Professor of Physics at McGill and who designed the device, says "it will be the most powerful of its kind in the world." The new magnet will have a maximum field of 250,000 gauss and a total power consumption of only 10 kilowatts; the largest magnet in Cambridge can also reach 250,000 gauss but requires a power consumption of ten megawatts to do so. Dr. Stevenson's project is supported by the National Research Council of Canada, with some additional aid from Magnetic Engineering Associates of Boston, Mass. The low-temperature equipment is being designed and built by Air Liquide, a Montreal firm whose engineers are collaborating on the cryogenic aspects.

Industry as well as science will be able to use the new Canadian tool for research in solid-state physics, Dr. Stevenson has announced. "It is expected," he said, "that half of the working time of the device will be available without charge to industry and other organizations outside the university for projects requiring cryogenics and the use of high-intensity magnetism." A helium refrigerator unit operating at -452° F is part of the installation since the device largely depends for its intense magnetic field on the exposure of the magnet's specially designed solenoids to these super-cold temperatures.

Research is still going on into the forces between atoms which lie behind the magnetic properties of solids. Perhaps the most important new technique for such research involves the use of extremely intense magnetic fields, powerful enough to disturb the interaction between magnetic atoms in solids. One way of producing these fields is to pass large electric currents—thousands of amperes in the McGill magnet—through the solenoids at very low temperatures. In this state, the electrical resistance of some conductors, such as niobium-tin alloy, becomes zero and of others, for example, pure aluminum, very small. This allows the production of high magnetic fields with little dissipation of power. And because the condition of super conductivity allows electric current to continue flowing in the cryogenic solenoid after the power source is disconnected, the magnetic field is maintained with "stored" energy.—*Fred Poland, Montreal Star.*

Defogging Airports

Small-scale weather modification is beginning to seem both technically possible and socially acceptable. Writers at the 1967 A.A.A.S. annual meeting in New York in December learned of progress along a number of weather fronts: studies by the forest service in Montana have led to reduction of about a third in lightning strokes that initiate forest fires; Russian scientists claim great success in hail modification, an achievement that could have great potential in this country's Midwest; and airlines are collaborating on programs to develop effective methods of dispersing fog around airports.

One fog-dispersal program is just coming to completion after three and a half months at Sacramento, Calif., by World Weather, Inc., under contract to the Air Transport Association, a service organization of the U. S. scheduled airlines; 33 A.T.A. members contributed \$100,000 to finance the test, under the technical direction of W. Boynton Beckwith, '36, Manager of Meteorology for United Air Lines. The object is to test the efficiency of new fog dispersal seeding products developed by Dow Chemical Company and Procter and Gamble in clearing warm fog. Warm fog, consisting of water droplets above freezing point, accounts for about 95 per cent of all fog at airports in the contiguous states; so far, no practical and economic method for dispersing it has emerged. By contrast, cold fog, in which the water droplets are supercooled below freezing point, is relatively easy to disperse.

The seeding materials appear to work on the warm fog by producing electric charges on the droplets; charged droplets attract each other and coalesce into larger droplets. As a result, visibility increases.

The dispersal materials are seeded into fog by dropping small amounts of fine powder, spraying small amounts of liquid, or dispersing the material through the aircraft's exhaust gases. By flying directly over the airport or upwind from it, World Weather pilots are trying to bore holes in the fog which will either remain over the runway and approach zone or drift to that location.

One reason for the choice of Sacramento for the program, apart from its high incidence of dense fog in winter (an average of over 70 hours per month in December and January) is its moderate air traffic—high enough to prove tangible benefit from a successful fog-dispersal program and yet low enough to allow the fog-seeding flights without disrupting normal traffic.

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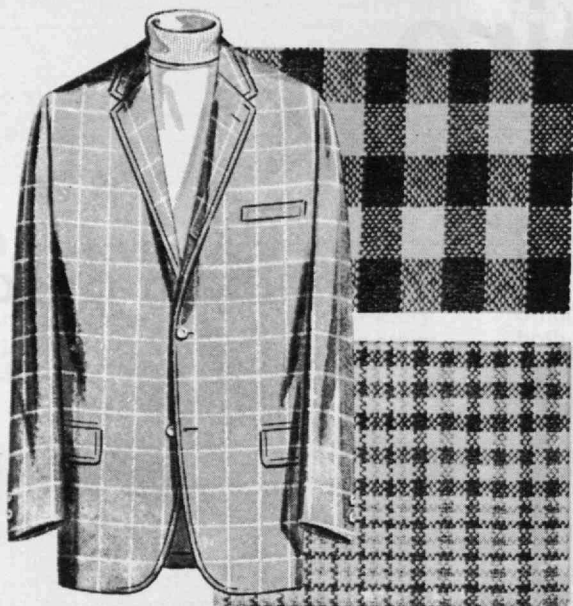
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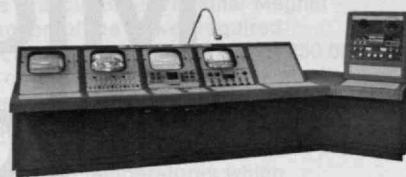
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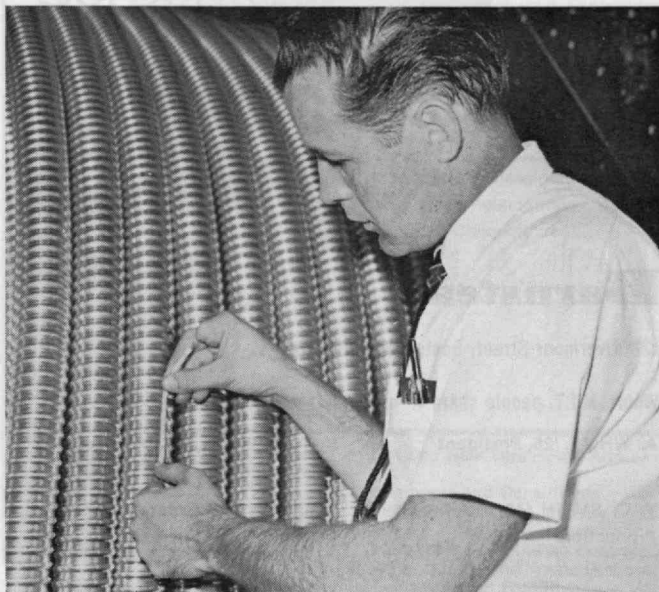
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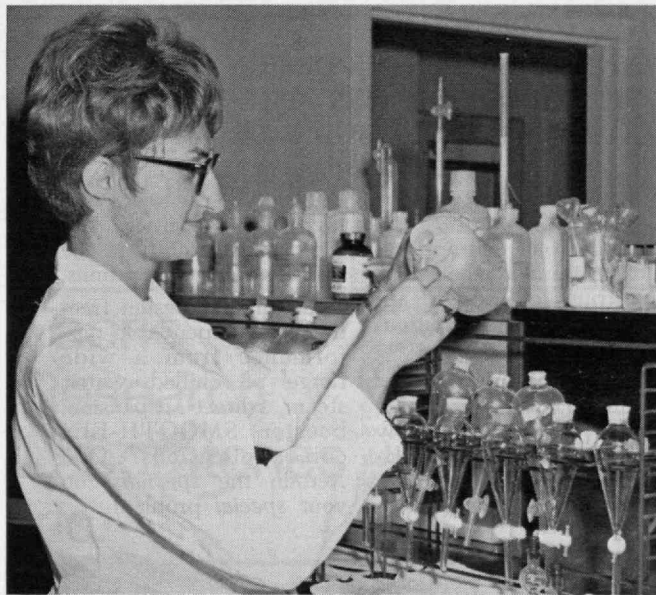
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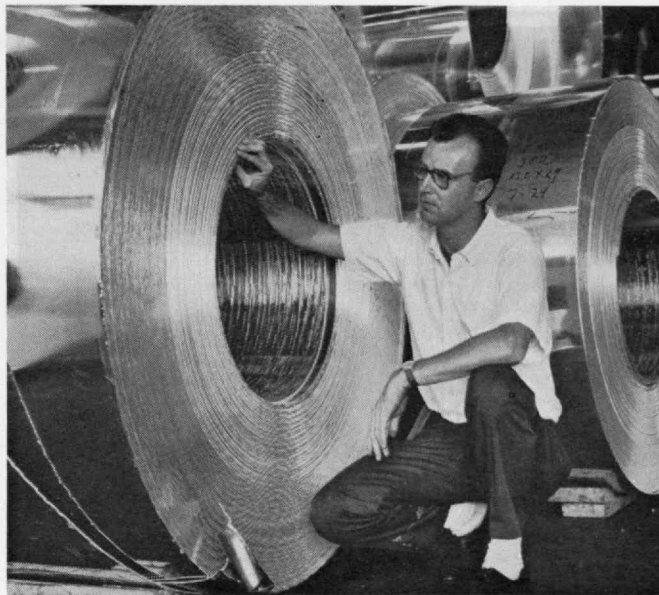
David A. Heatwole (MS Geol., U. of Arizona '66) is a geologist doing geological and geochemical work with an Anaconda exploration team in the southwest US and Mexico.



James F. Lynch (BS Mining E., U. of Missouri, '61) is a general foreman at Anaconda Wire and Cable Company's plant in Marion, Indiana.



Marie C. Vecchione (MS Phys. Chem., Yale '62) is an analytical chemist in Anaconda American Brass Company's research and technical center, Waterbury, Connecticut.



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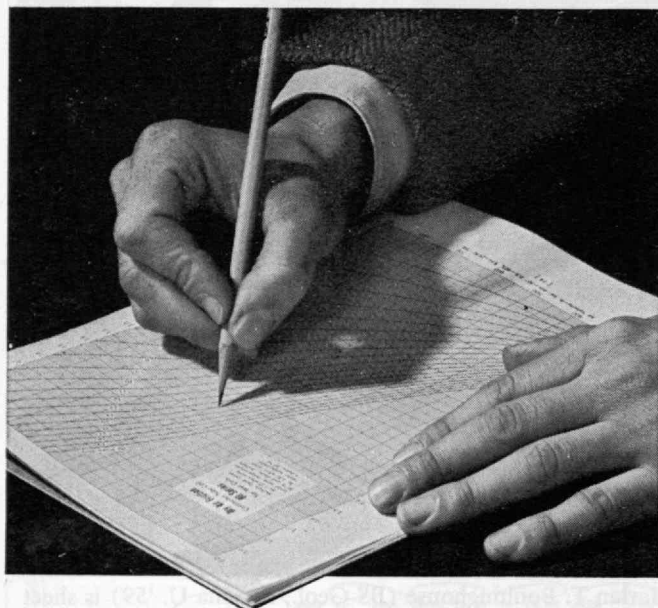


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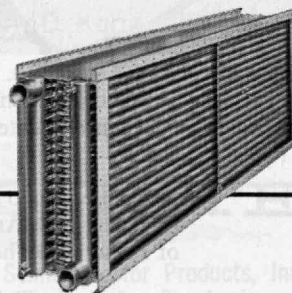
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Institute Review

No Preferential Treatment

While such national agencies as the American Council on Education are taking strong action to preserve the draft deferment of graduate students, the M.I.T. faculty has urged that science, engineering, and medical students receive no preferential treatment under whatever law governs the Selective Service System.

The Selective Service law enacted last year requires that virtually all seniors who graduate in June, as well as graduate students who complete their first year or receive degrees, be reclassified for induction. Only those in the health fields have thus far been exempted, but the Interagency Advisory Committee on Essential Activities and Critical Occupations has recommended deferments for graduate students in natural science, mathematics, and engineering as well. Now the M.I.T. faculty recommends instead that all graduate students "be treated equally without limitation or preference as to their particular disciplines or fields of study."

The M.I.T. resolution was presented to the faculty in December by the Committee on Graduate School Policy after extended discussion, and it was finally approved by a majority of more than 100 at the January faculty meeting. Thus the faculty expressed its strong view that students in the humanities and social sciences, for example, should have the same consideration for deferment that they would have if studying science or engineering.

"There is a wide range of opinion within our faculty on several aspects of the draft legislation and its administration," Howard W. Johnson, President of M.I.T., said in commenting on the faculty debate. "But there is agreement on the grounds of educational policy—that in the absence of a broad national emergency, no specific segment of our graduate students should be favored over any other. Obviously scientists and engineers are vitally essential in our society. But, in the long run, the nation depends on the work of men from all fields of higher education;

and national service, when required, should bear equitably on students in in all fields," President Johnson said.

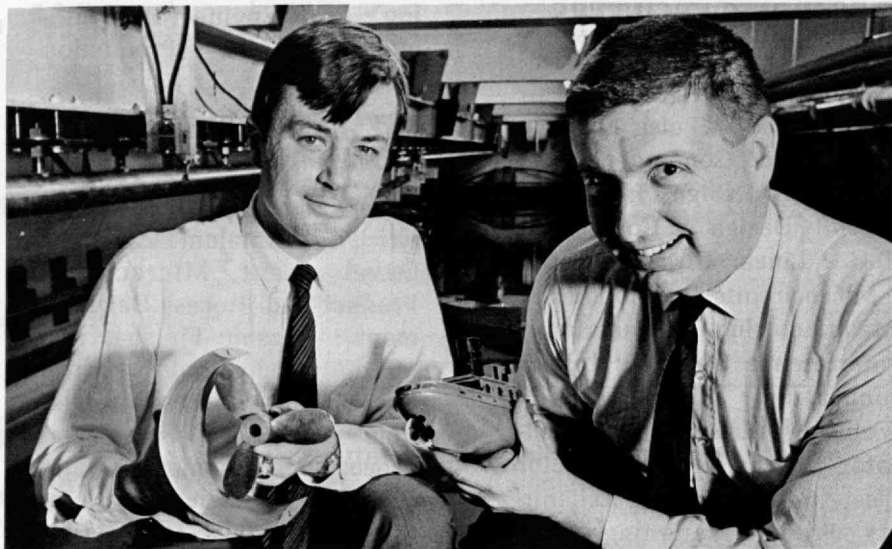
Copies of the M.I.T. faculty resolution were sent to the White House and to the members of the National Security Council, which has not yet announced its policy on graduate student deferment.

Shroud vs. Rudder

Two young naval officers pursuing graduate studies at M.I.T. have devised and analyzed a novel plan for steering ships and power boats. Lieutenants Samuel J. Gordon, S.M.'66, and Peter T. Tarpgaard, Jr., both officers of the U.S. Navy studying at M.I.T. under military orders, would replace the traditional rudder with a rotatable half-shroud around the propeller. Their idea is that the propeller will drive water backward on the inside surface of the shroud, creating a lower pressure on the inside surface and a consequent thrust, or pushing force, on the outside surface. To turn to port, for example, the helmsman would rotate the shroud to the port side of the propeller, producing a starboard-directed

thrust on the aft end of the vessel and thereby swinging the bow to port. In calm seas, they hypothesize, the shroud could be positioned in the underside of the propeller, producing an upward force, literally tending to lift the aft portion of the vessel a bit and decreasing its effective displacement. And in stormy weather, particularly with a following sea, the shroud could be positioned above the propeller to yield a downward force that would help keep the aft portion of the vessel down. The students' analyses show the half-shroud idea should enable a ship to turn faster than is possible with a rudder.

The students have mounted a half-shroud on a battery-powered tugboat model to confirm these theoretical predictions, making precision measurements of the forces exerted on a scale-model propeller and shroud instrumented through an overhead carriage in M.I.T.'s Ship Model Towing Tank. And the findings, presented in a paper before the Society of Naval Architects and Marine Engineers in New York this winter, brought them the Society's 1967 Graduate Paper Honor Prize.



Peter T. Tarpgaard, Jr. (left) holds a scale model propeller and steering shroud while Samuel J. Gordon, S.M., '66, holds a battery-powered tugboat model that employs a shroud around its propeller. The two, both U.S. Navy officers at M.I.T. for graduate study, have advanced and analyzed the idea of replacing the conventional rudder with

a half-shroud around the propeller for steering. The tugboat model was used in the M.I.T. Ship Model Towing Tank (background) to demonstrate the theory, while the scale model propeller and shroud, fully instrumented, was used in the propeller tank for precision measurements of system dynamics.

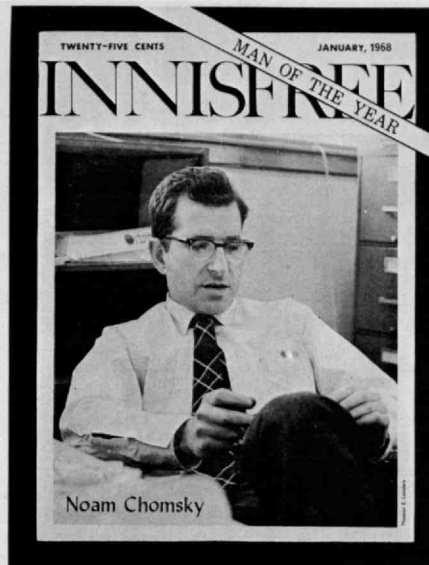
Man of the Year

The "Man of the Year" designation from *Innisfree*, the fast-rising M.I.T. student journal of opinion and comment, has gone to Noam A. Chomsky, Ward Professor of Modern Languages and Linguistics, for "facing and acting upon one of the largest social issues of the day, combining intellectual analysis with perseverance and a moral sense."

The nomination stems from Professor Chomsky's outspoken opposition to U.S. involvement in Vietnam and his earlier position in the civil rights struggles. "There are few men," writes David N. Caplan, '69, of the *Innisfree* Literary Staff, "whose minds actively explore possibilities of the social order other than existing ones and alternatives to decisions made by the ruling powers within a given system. There are still fewer who, to achieve these possibilities, involve themselves in political and social action which places their own positions in jeopardy. Dr. Chomsky is one such man."

Here are some additional excerpts from *Innisfree*'s "Man of the Year" essay: "In the past year Noam Chomsky has spoken at a multitude of gatherings as diverse as teach-ins, faculty seminars, rallies, marches, and resistance meetings; published articles; organized committees; and been in continual contact with the leaders of the movement seeking out alternatives to the American war in Vietnam. He has been arrested and imprisoned, and is indictable on charges from tax evasion to conspiracy. He is one of the most active intellectuals in the antiwar movement. . . . For Dr. Chomsky, the character of the war and the character of the decision-making in the United States are transparent. He sees the war in Vietnam as the darkest aspect of American history, a crime of political aggression on a scale far greater than the crimes of the Japanese prior to World War II and a crime against humanity on a par with some of the actions of the German Nazi rule."

Dr. Chomsky himself has summarized his views in *The New York Review of Books* for February 1: "(I believe that) resistance . . . is an obligation for those who fear the consequences and detest the reality of the attempt to impose American hegemony. Resistance cannot now significantly deplete the manpower pool that makes possible the use of American power for global repression, nor can it, at the moment, significantly impede the research, production, and supply on which this exercise of power rests. But it can contribute significantly toward raising the domestic costs of this attempt and eliminating the apathy and passivity that may permit it to succeed. It therefore has a potential significance that extends far beyond Vietnam. It may help to save other small countries from the fate of Vietnam, and indeed to save the world from indescribable catastrophe."



Innisfree, an independent magazine of student opinion, admits that M.I.T.'s image to the world is "scarcely one of a radical political community." But the campus liberals occasionally make their mark, and Noam A. Chomsky, Ward Professor of Modern Languages and Linguistics, has helped them "put M.I.T. on the map" this year. Hence *Innisfree*'s January cover which reproduces a photograph by Thomas E. Landers.

Advanced Engineering Studies

Four special summer activities designed to help practicing engineers use new scientific and engineering techniques have been announced for the coming summer by Harold S. Mickley, Sc.D. '46, Director of the M.I.T. Center for Advanced Engineering Study. All four are open to limited registration, and information folders and application blanks are available from the Center, Room 9-221, M.I.T.; requests from *Technology Review* readers will receive special attention. The four programs are:

Probabilistic Methods, June 11-28: an intensive course to help engineers, scientists, and administrators approach the formulation and analysis of probabilistic situations with the same confidence they usually bring to conventional deterministic problems. Directed by Alvin W. Drake, '57, Associate Professor of Electrical Engineering and Associate Director of the M.I.T. Operations Research Center.

Experimental Solid-State Physics, June 17-July 19: lectures and experimental projects chosen to provide experience with basic properties of solid-state materials and relevant research techniques. Directed by Arthur C. Smith, Associate Professor of Electrical Engineering. Partial support for the program is provided by the National Science Foundation.

Field-Effect Devices, July 15-August 2: a concentrated treatment of junction and metal-oxide semiconductor field-effect transistors, covering physical electronics, fabrication, circuit design, and applications. Directed by Bruce D. Wedlock, '56, Associate Professor of

Electrical Engineering, and David H. Navon, Visiting Associate Professor of Electrical Engineering.

Engineering Systems Analysis, August 12-23: a workshop course combining theory and practice in the use of computer-aided engineering systems analysis, including specific applications in such fields as transportation, water resources, and benefit/cost and cost/effectiveness studies. Given by members of the M.I.T. Civil Engineering Systems Laboratory.

Those enrolled for these programs will work on the M.I.T. campus, and dormitories, dining rooms, and recreational facilities will be available.

John K. Dupress, 1922-1967

A heart attack on December 29 proved fatal to John K. Dupress, who had served as Director of the M.I.T. Center for Sensory Aids Evaluation and Development (see *Technology Review*, Dec., 1966, p. 28) since its founding in 1964. His informal association with M.I.T. began in 1958 with his appointment as Director of Technological Research for the American Foundation for the Blind, and he began a formal affiliation with the Institute as a guest in 1960, later becoming a part-time Research Affiliate in Electrical Engineering (1962) and a full-time member of the M.I.T. staff in 1963.

Mr. Dupress studied at Lehigh University for one year before entering the U.S. Army in 1943; he lost his sight and his right arm in a hand grenade explosion during the Battle of the Bulge in France. Despite these handicaps he returned to college for the A.B. degree (Princeton) and for advanced studies in psychology and engineering at Louisiana State University, Lehigh, and the University of Connecticut. He participated in planning the M.I.T. Center for Sensory Aids Evaluation and Development, and while its Director, Mr. Dupress held a concurrent appointment as Research Associate in the Department of Mechanical Engineering.

Frustrated by Inaction

Howard W. Johnson, President of M.I.T., and Joseph Bacheller, President of the Suffolk Franklin Savings Bank, together resigned from the board of the Massachusetts Housing Finance Agency early in January to protest the failure of the 1967 Massachusetts Legislature to enact a series of housing bills. Governor John A. Volpe said it was a "classic example of dedicated, talented men from private life giving of their abilities and energies for the people of Massachusetts only to find themselves frustrated as a result of legislative inaction." The Governor re-submitted his housing program to the 1968 Legislature, saying he hoped for its approval "so we will not continue to lose the other members of the agency. The situation is most disturbing," he declared.



Overcompensation by Everyone

Though they've been here almost since the beginning—and recently in dramatically increasing numbers—M.I.T. still has not really come to terms with its co-eds. They are a minority, just under 200 women out of this year's 4000 undergraduates. But the completion last month of McCormick East, putting 226 women students, far more than ever before, into the most conspicuously comfortable on-campus housing at the Institute, marks another step in the feminization of M.I.T. And the end is not yet. As one co-ed told *Innistree*, the student magazine of commentary, last spring, "What co-eds want, co-eds get. . . . When a girl walks into a class, she is more likely to be remembered than any boy . . . she can count on overcompensation by everyone."

Sometimes she needs it. The M.I.T. co-ed, said Gail Halpern, '68, in a highly literate essay in the 1967 *Technique*, has to make some adjustments: "She must adjust herself to being the only girl in a class of 30, or to being one of two or three girls at a large dinner. She learns to live and react among fellows who are employing their everyday, 'just-with-the-guys' vocabulary, to fade gracefully out of existence when the

conversation turns overly masculine, and to incorporate her femininity smoothly into a basically alien atmosphere; this includes donating a lipstick for labeling test tubes and accepting 'Dear Sir' letters without getting disturbed."

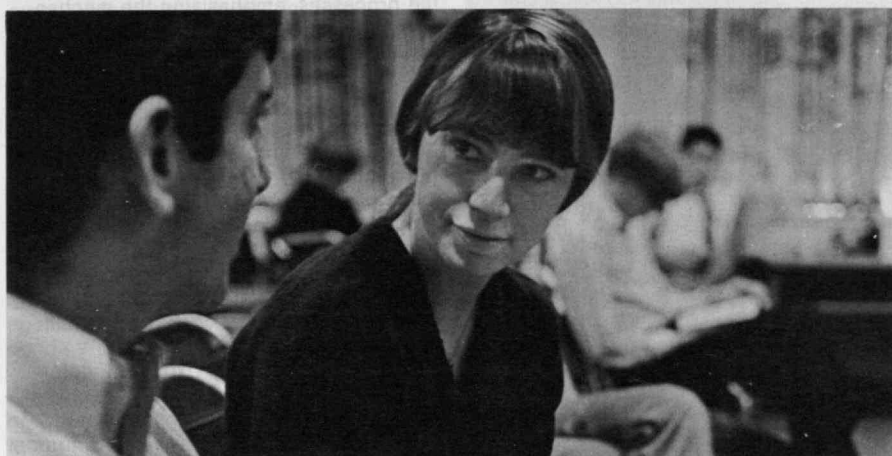
"In my humanities class," one co-ed told Mildred S. Dresselhaus, Abby Rockefeller Mauze Visiting Professor in Electrical Engineering this fall, "there are just barely enough chairs to go around. If I get there early and sit in the middle, all the chairs around me will stay vacant until the instructor comes and asks the boys standing to sit down . . ." "I had one professor," another told her, "who would bring homework papers in alphabetical order, with mine on the bottom. He would pass them all out, then leave mine lying on the corner of his desk where I could pick it up as I left the class."

There are special rewards, too. "The guys here are not afraid of me because I'm smart," one co-ed reported to the *Innistree* survey. Miss Halpern noted that M.I.T. "is one of only a few schools a girl can find where physical education is not a requirement." And, she pointed out in another paragraph, "whatever else she is or is not, the co-ed is gloriously and almost unconditionally

free" . . . by which she meant the lack of such onerous personal requirements as signing out and signing in, and dashing home from a Boston party just to meet the requirements of curfew; except for a few months of the freshman year, there is no curfew.

M.I.T. co-eds are at once the same and different. "The ease with which scientific terminology is thrown around McCormick Hall can make the uninitiated cringe," Miss Halpern admitted. But any even slightly observant campus visitor will sense that familiarity with slide rules, lathes, and computers doesn't deny M.I.T. co-eds a familiarity with patterned stockings, miniskirts, Courreges boots, falls, and long earrings. "Lately," writes Miss Halpern, "Tech-men have even been known, when they're not being watched, to call the co-eds 'girls.'"

It remained for *Innistree* to ask the ultimate question: "Would you send your son or daughter to M.I.T.?" Among the answers: "Definitely not my son, possibly my daughter." . . . "My son, perhaps, my daughter, no. I don't like M.I.T. as a place for girls. I don't think the girls really take enough time out to care about themselves." . . . "Yes. I can't think of any other girl's school where I would be happy."



The advantages of being a co-ed at M.I.T.? "We're unique and we're here!" one of them told a survey by *Innistree*, the student independent magazine, last spring. Co-eds, concluded *Innistree*, need no special sympathy: "Fear of prejudice works bountifully in her favor. . . girls get more credit for trying on quizzes. . . her professors are friendlier and more helpful." Five pictures—opposite, top and lower right—Daniele Beaudry, '69, by Arthur A. Kalotkin, '68; above—Dinah Schiffer, '69 (left), and Melinda Bird, '70, by Owen D. Franken, '68.

Special Summer Programs

Plans for 43 two-week "short courses" on new topics in science, engineering, architecture, and the related fields of management and social science to be given at M.I.T. during the summer of 1968 have been announced by James M. Austin, Sc.D.'41, Director of the Summer Session. Further information and application forms are available from the Summer Session Office, and early application is recommended. The 1968 subjects are:

Chemistry:

Infrared Spectroscopy Technique and Applications, August 5-9 and August 12 to 16: experimental aspects and applications of infrared spectroscopic techniques.
Photochemistry and Solar Energy Conversion on Earth and in Space, July 15-26: energy and charge transfer processes involved in photochemical and related thermal reactions.

City Planning:

City and Regional Planning, June 17-28: general principles of urban and metropolitan planning with special emphasis on air transportation.

Civil Engineering:

Steel Building Technology, June 24-28: basic architectural and structural concepts for steel buildings, including analysis and design techniques.

Economics:

Probability for Non-Probabilists, July 8-19: the basic theory and applications of probability, with emphasis on the study of random variables and time-dependent stochastic processes.
Forecasting with Econometric Models, August 12-23: methods of formulating and estimating statistical models with economic data and of using such models for forecasting.

Electrical Engineering:

Techniques in High-Speed Photography, June 17-21: scientific and engineering uses of high-speed photographic measurement techniques.
Problems in Multiple-Access Computer System Design, July 8-19: the organization of control and service procedures and specific hardware design in connection with large time-shared computers.
Information Technology, August 19-30: the present state and future directions of modern computer and communication engineering applied to handling technical, scientific, and managerial information.
Image Processing—Basic Techniques and Applications, August 5-16: basic digital, computer, optical, and electro-optical image processing techniques common to most applications of pattern recognition and picture coding.
Modern Control Theory and Its Applications, August 5-16: background and basic principles of optimal control theory, including filtering and nonlinear stability.

Environmental Health:

Current Concepts for Managing Environmental Health Hazards, June 11-15: in-

formation for management useful in making decisions on the control of potential health hazards in industrial operations.

Management:

Industrial Dynamics, June 11-21: quantitative study of interrelated flows of information, orders, capital equipment, material, money, and manpower and their implications for management decisions.
Management Information Technology, July 8-19: an intensive program in digital computer systems, programming, and applications intended for operating managers.
Management Information Systems, July 22-August 2: computer applications and their economic and organizational implications, planned for those with some familiarity with computer hardware and software.
Mathematical Programming, August 5-16: the theory of linear, nonlinear and integer programming and computational techniques and applications to management problems.
Operations Management, September 4-13: decision-making techniques for operating managers, including information systems to support models and their successful implementations.
Systems Analysis for Marketing Management, June 11-21: systems analysis as a tool for market planning and control, including techniques used to define, structure and solve problems.
Management Science in Marketing, September 9-20: recent advances in the application of management science to marketing, including new product planning, interactive, adaptive and microanalytic simulation, and stochastic models.
Management of Research and Development, August 19-30: organizational systems analysis and design and human relations concepts and practices for research and development managers.
A Design for Strategic Planning, August 19-30: how to formulate and implement organizational strategy, including variables in the analysis of business situations and designing courses of action.

Mechanical Engineering:

Photoelasticity and Moiré Techniques, June 17-21: applications of polarized light and interference grid techniques for measuring strains and displacements.
Strain Gage Techniques, July 8-19: lectures (first week) and laboratory work on wire, foil, and semiconductor strain gages.
Nondestructive Testing, June 24-28: magnetic particle, fluid penetrant, x-ray, ultrasonic, and eddy current methods of nondestructive testing and new techniques for analysis.
Physical Measurement and Analysis, June 11-21: mechanical measurement techniques surveyed from a fundamental point of view, including measurement analysis and apparatus.
Modern Developments in Heat Transfer, July 8-19: recent heat transfer developments, emphasizing fundamental principles and their application to engineering problems.
Physical System Dynamics, July 29-August 2: techniques for analysis and simulation of multiport engineering sys-

tems based on power and information flow as represented by bond graphs.

Properties of Fibers and Semicrystalline Polymers, July 15-19: recent developments in studies of polymer structure and mechanical behavior.
Performance Characteristics of Textile Materials, July 22-26: new fiber materials, textile finishes, and manufacturing processes and their influence on textile product performance.
Applied Mechanics of Fibrous Structures, July 29-August 2: recent research on the mechanical behavior of fibrous materials as influenced by rheological properties of the fibers, structural geometry, and interaction between system components.
Dynamics of Textile Processing, August 5-9: recent research on old and new textile processes, emphasizing the mechanics of the processing in terms of machine variables, material properties, and interactions between fiber and process.

Metallurgy:

The Electron Microanalyzer and Its Applications, June 17-28: studies of the instrumentation required and of analytical procedures, applications, and microdiffraction techniques.
Materials Fabrication Processes, July 15-26: processes common to metals, ceramics and plastics, including solidification, zone refining, slip casting, sintering, heat treating, extrusion, deformation, and vapor deposition.

Nuclear Engineering:

Fast Nuclear Power Reactor Safety, July 8-19: safety problems and their solution in design, construction and operation of large fast nuclear power reactors.
Water-Cooled Nuclear Power Reactor Safety, July 15-26: safety problems and their solution in the design, construction and operation of water-cooled nuclear power reactors.

Nutrition and Food Science:

Current Topics in Food Technology, June 17-21: review of areas of current interest in food preservation and product development—membranes in food processing, environmental health, protein sources, and flavor research.
Nutrition in Oral Biology and Pathology, June 24-28: recent advances in biochemical, clinical, and applied nutrition, planned primarily for faculty members of dental schools.

Operations Research:

Operations Research for Public Systems, September 3-7: applications of the operational methodology to problems in public systems.

Statistics:

Factorial Designs in Scientific Experimentation, July 8-19: factorial and fractional factorial experimental designs and their use in modern scientific work.

Technical Writing:

Communicating Technical Information, August 5-9: a course in technical communication for those responsible for generating, supervising, and editing written material on technical subjects.

Individuals Noteworthy

David B. Brooks, '55, is now Chief of the Division of Economic Analysis, Bureau of Mines, U.S. Department of the Interior. Dr. Brooks will be responsible for economic studies related to mineral resource development.

Andre C. Deprez, S.M.'55, is now Vice President—Marketing Services for the Scientific Design Company, and **Manfred Gans, '51**, is Vice President—Process Engineering and Operations.

Alan H. Stenning, Sc.D.'55, is now Acting Chairman of the Department of Mechanical Engineering, Lehigh University. Lt. Colonel **Leonard R. Sugarman, '55**, received the Air Force Systems Command's Meritorious Award for Support Management. The citation reads "...exceptionally meritorious service to the United States Air Force... as the executive officer for the Air Force Missile Development Center's Central Inertial Guidance Test Facility..."

Patrick J. Coletta, S.M.'56, has been appointed Director of Production Engineering for the Detroit Assembly Division of General Motors Corporation. **Frederic E. Hoeltzel, '56**, is Manager of Plant Engineering for the Anaconda Wire and Cable Company.

Frederick O. Ziegler, '56, is now Manager of Communications Systems Manufacturing for Defense Electronic Products. **Jay R. Bonnar, '57**, has been appointed Research Administrator of Anaconda American Brass Company. **Henri Fenech, Ph.D.'57**, Associate Professor of Nuclear Engineering, has been awarded a N.A.T.O. Senior Foreign Fellowship in Science for study at the Atomic Energy Authority in Risley, England, the Center for Nuclear Studies in Cadarache, France, the Baden Institute of Technology in Karlsruhe, Germany.

Peter A. Samton, '57, **Rolland D. Thompson, S.M.'49**, and **Norval C. White, '49**, have joined **B. Sumner Gruzen, '26**, and his son **Jordan L. Gruzen, '57**, as partners at Gruzen and Partners, Architecture-Planning-Engineering.

Aaron J. Gellman, '58, is now Vice President—Planning, The Budd Company. **Melford E. Monsees, '58**, is now Executive Manager of Richard Muther and Associates, as well as part-time Lecturer in civil engineering at the University of Missouri. **George B. Stone, S.M.'58**, is now General Manager of Pfizer Laboratories; he is responsible for all of Pfizer's domestic pharmaceutical marketing business. **George R. Huguenin, '59**, a leader in work on radio astronomy, is now Senior Research Associate in the Harvard College Observatory.

Alan W. Sampson, S.M.'59, was elected Alumni Trustee of Tufts University. **Guy W. Nichols, S.M.'61**, is now Vice President of the New England Electric System. **Richard J. Resch, '61**, is now Vice President of Manufacturing at the Krueger Metal Products Company.



Strobe Probe

Harold E. Edgerton, Sc.D.'31

Mystery Photograph

A string can be used to show a displacement-time curve. Here, Professor Tsuneyoshi Uyemura of the University of Tokyo, Visiting Associate Professor in the Strobe Lab, triggers a hammer that strikes a metal bar. The string is fastened to the bar. Two exposures are made—the first when the hammer strikes, the second after about 80 ms. The first shows the string at rest, the second shows the motion of the string and thereby the bar.

Correspondence Review

Voices of Dissent (Cont'd)

To the Editor:

I do not like the new format of the *Review*.

The use of Gothic type is regrettable. Its use represents a departure from the aesthetic, a move toward the commercial with the appearance of something cheaper—definitely not distinctive, as one would expect from M.I.T.

I find the reading of great masses of sans-serif Gothic type annoying and tiring. The serifs on the top and bottom of the usual type of letters serve to provide boundary—absence of serifs seems to help the eye to wander above or below the line of interest. The over-all effect is one of discouragement to reading.

I also dislike the uneven right-hand edge of each column, the lack of "justifying" the individual lines. The appearance is one of saving money, forgetting the beautiful, getting something out fast like ordinary typewriter copy.

Harold F. Dodge, '16
Mountain Lakes, N.J. 07046

To the Editor:

My over-all reaction to your new format for the *Technology Review* is negative because I find the sans-serif type difficult to read, even though the new layout is very pleasing. My library has only three books on typography and they are unanimous in supporting my feelings.

With more experience I am sure I could get used to sans-serif typefaces but I think the legibility might be improved with a typeface having larger ascenders and descenders, reducing the x-height to keep the type body the same. By doing this you would strengthen the horizontal linear effect, which would help one follow the line more easily. Another possibility might be to increase the spacings between words; and the only way I can imagine this done without cutting down the number of words per column, would be to use at least partial justification on the right. You would then be able to increase spacing slightly on some lines and so provide some contrast.

I think the quality of the paper and the sharpness and depth of the photographs outstanding, and my only criticism of a worthy step forward in layout and typography is that I find myself getting eyestrain reading large bodies of the text.

Bruce P. Bogert, '44
Morristown, N.J. 07960

To the Editor:

We are both alumni, and feel that we must add our comments to the controversy over the new appearance of *Technology Review*. Despite its scholarly tone, your "Note About the New Review" has an underlying stubbornness: they aren't gonna make us change it after we went to all that trouble.

We note that the letters on your new format are divided in a significant way: the disapproving comments are almost all concerned with legibility, and the compliments are mostly on the new image. We are all for good graphics, clean design, and well-proportioned pages; these qualities are not inextricably linked with your new typeface.

There are many typefaces with beautiful and appealing letter forms, but despite the fact that Helvetica is designed "in conformity with optical laws," it is jarring and illegible as you have set it. Perhaps the leading could be adjusted; perhaps paragraph indentation would help; but the net effect of the change is to direct more of the reader's attention to the pictures and less to the text. It is a contemporary trend, and not necessarily a good one. Gutenberg's letter forms may not have been designed in conformity with optical laws, but he managed to compose pages which are still landmarks of good book design. We hope that, having had the flexibility to change your format, you will have the flexibility to adjust it in conformity with the enjoyment and satisfaction of your readers. Remember the Edsel—even a new design may need a little creative evolution.

Dr. and Mrs. Morton Grosser, '53
Palo Alto, Calif. 94306

To the Editor:

Greetings from the Class of 1913. We

salute you for the outstanding job you are doing. We cannot stand still.

George P. Capen, '13
Canton, Mass., 02021

Buildings and Plans

To the Editor:

Why not devote a portion of each *Technology Review* to campus developments? Make it a separate department with its own letters section; show buildings under construction, floor plans, and so on. I, for one, am deeply interested in such things. I have many ideas to 'spruce up' M.I.T., but no forum for them.

Leonard Levin, '66
Seattle, Wash., 98125

To the Editor:

After several years of personal campaigning with faculty, *Review* staff, and alumni, I was delighted in the January, 1968, *Review* to find on page 65 a partial floor plan included with a perspective rendering of some proposed new dormitories for the campus. My heartiest congratulations to each and all of you responsible for this. We, architectural alumni, have always been aware that we are a small part of Tech in terms of numbers and funding. But plans, sections, and elevations are a basic way of our understanding and communicating architectural ideas—not only for ourselves, but for others. So, when our alumni magazine shows proposed buildings, new buildings or old buildings concerning Tech, we can better appreciate what is intended if a plan and occasionally a section and elevation can accompany the usual three-dimensional view. The plan is important.

Your new *Review* layout and size are handsome and your emphasis on current issues, rather than just events, extremely encouraging.

Thanks again for this plan inclusion; I hope similar ones may be added in the future.

Robert R. Ferens, '48
Eugene, Ore., 97403

Puzzle Review

Allan J. Gottlieb, '67

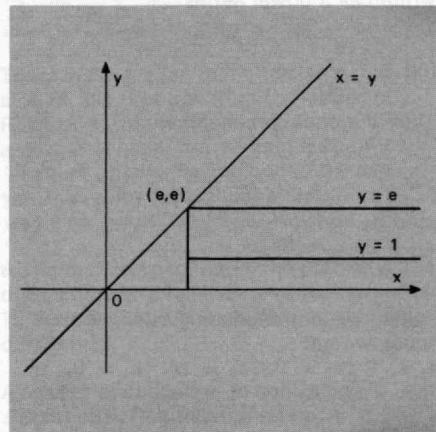
I have a personal problem whose solution I would really welcome. Why is it that no matter how long I spend studying for an exam, it always turns out that I needed about two hours more? Anyone who explains this to me and includes a solution which works will receive six free issues of both *Technology Review* and *Tech Engineering News*, even if I have to pay for them myself.

A very conscientious reader phoned me a few weeks ago to ask where he should send his solutions. I must apologize for not including that information in each installment. This oversight shall be corrected: address all correspondence to me at the Department of Mathematics, Brandeis University, Waltham, Mass., 02154.

Problems

20 This month's first problem was submitted by the Head of the M.I.T. Mathematics Department, William Ted Martin:

In problem 5 (see *Technology Review* Dec., 1967, p. 62) it is asked whether π^e is greater than, equal to, or less than e^π . While this may be answered by computation or by other means, it is a special case of the following question: If x and y are positive numbers with $x > y$, is x^y greater than, equal to, or less than y^x ? The readers are asked to prove the following:



Let $x > y \geq 0$ show that
a) if $y \geq e$, then $x^y < y^x$

- b) if $x \leq e$, then $x^y > y^x$
c) if $y < 1$ and $e \leq x$, then $x^y > y^x$, and
d) if $1 < y < e$, then there exist (infinitely many) values of $x > e$ such that $x^y < y^x$ and (infinitely many) values of $x > e$ such that $x^y > y^x$, and exactly one value of $x > e$ such that $x^y = y^x$. (Show that a corollary of this is the well-known fact that there is exactly one solution of $x^y = y^x$ for x and y integers, $0 < y < x$.)

21 The following came from Allen L. Zaklad, '65:

To introduce myself, I graduated from the 'Tute in '65 in mathematics and am now at the University of Pennsylvania in psychology. Being an old bridge player, I've decided to play with your problems and give you a couple of my own. One of them:

This is an end-game double-dummy problem, one of the classics of the game, called the "Whitfield Six":

♠ 7 3	♠ —	♠ 6 2
♥ —	♥ 6 3	♥ —
♦ K 10	♦ A 9	♦ 8
♣ 9 5	♣ 8 2	♣ 7 4 3
	♠ 5 4	
	♥ —	
	♦ Q	
	♣ J 10 6	

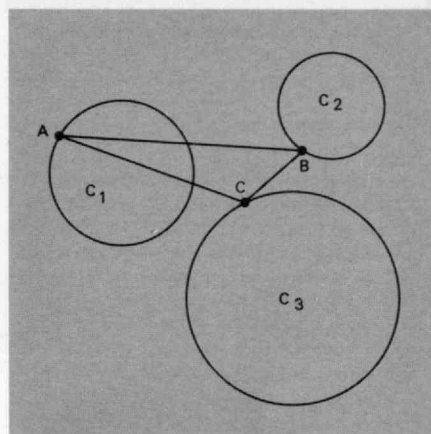
South to lead, hearts trump; North-South to make all the tricks against any defense.

22 My girl friend, a physics major at Brandeis, has told me that all contemporary physicists have the Hilbert space theory "scoped out" (understood completely). Here is a very elementary problem about Hilbert spaces to test her hypothesis:

Let V be a closed convex set in a Hilbert space H . Let $x \in H - V$. Prove that there exists a unique $y \in V$ which is of minimal distance from x .

23 Here is a letter from Mark H. Yu, '70, "Senior House's answer to Martin Gardner":

Here's an original problem that I thought might be of interest to you:



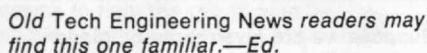
Suppose we are given three co-planar circles with centers C_1 , C_2 , and C_3 and radii equal to r_1 , r_2 and r_3 , respectively. Choose three points, one on each circle, and label them A , B and C . The problem is to find the maximum and minimum areas of such a triangle ABC , in terms of r_1 , r_2 and r_3 and C_1C_2 , C_2C_3 and C_3C_1 . (Admittedly, this is a hard problem. I solved it for the maximum-area case through analytic geometry and various transformations. As for the minimum-area case, I derived four fourth-degree equations (or something like that). I believe that these problems can be solved using transformations only (i.e., $\triangle ABC$ can be constructed legally) by someone who is more competent than I. I'm willing to give a year's subscription to *Tech Engineering News* for correct solutions.

24 The last regular problem is from Kenneth W. Dritz, '66, who writes: Your *Technology Review* readers might be interested in the following generalization of John H. Boynton's ('58) problem 1 (see *Technology Review*, Oct./Nov., 1967, p. 74):

Let N be an R -digit number, written $n_0n_1 \dots n_{R-1}$, in the base R number system, such that n_0 is the number of 0's in N , n_1 the number of 1's, and so on up to $R - 1$. For what R does N exist? For which of these is it unique?

Speed Department

SD7 George A. W. Boehm asks the length of the line AB on the following page:



SD8 Make 100 with four 7's (i.e., $7/7 - 7/7$ or $(7 + 7)^{7/7}$, etc.).

5 Is π^e greater than, equal to, or less than e^π ?

A theoretical solution came from Eric Rosenthal (son of Meyer S. Rosenthal, '47):

You can use elementary calculus to find $(e, e^{1/e})$ is a maximum point of $y = x^{1/x}$ and also is the only maximum or minimum.

So $e^{1/e} > \pi^{1/\pi}$
 $(e^{1/e})^{e\pi} > (\pi^{1/\pi})^{e\pi}$
 $e^\pi > \pi^e.$

Readers may also be interested in the following from Robert Fitch (son of John T. Fitch, '52):

I am a junior at Concord-Carlisle (Mass.) High School and I have obtained an answer to problem 5 using an I.B.M. 1130 computer. I have enclosed a print-out of the program I wrote (above, right). It is written in FORTRAN and works by computing values for e^π and π^e . It then compares the two and prints the result. The execution of the program occurs at the bottom of the print-out, with the values of the two numbers being typed out and then the result of the comparison. As you can see, π^e is less than e^π .

Also solved by Richard J. Grant, '65,
John P. Rudy, '67, Douglas J. Hoylman,

```

// JOB T
// FOR
*LIST SOURCE PROGRAM
*EXTENDED PRECISION
*IOCS(CARD,TYPEWRITER,KEYBOARD,DISK)
PI=3.14159265358979323846
EPI=EXP(PI)
PIE=ALOG(PI)
PIE=PIE*2.718281828459045
PIE=EXP(PIE)
WRITE(1,1)PI
1 FORMAT('E TO THE PI EQ'ALS 'F25.20)
WRITE(1,2)PIE
2 FORMAT('PI TO THE E EQUALS 'F25.20)
3 IF(EPI-PIE)5,4,5
4 WRITE(1,6)
6 FORMAT('PI TO THE E IS GREATER THAN E TO THE PI')
GO TO 9
7 WRITE(1,7)
7 FORMAT('PI TO THE E IS EQUAL TO E TO THE PI')
GO TO 9
8 WRITE(1,8)
9 FORMAT('PI TO THE E IS LESS THAN E TO THE PI')
9 CALL EXIT
END

FEATURES SUPPORTED
IOCS
EXTENDED PRECISION

CORE REQUIREMENTS FOR
COMMON 0 VARIABLES 10 PROGRAM 160

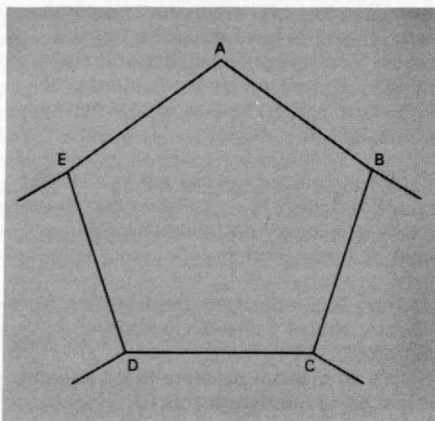
END OF COMPILATION

```

'64, Beverly Seavey, James P. Friend, '51, Howard W. Nicholson, Jr., '66, Andrew D. Egendorf, '67, and Jan M. Chaiken, Ph.D. '66.

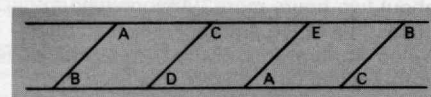
6 Take a strip of paper with parallel edges; tie an overhand knot, making sure there is no looseness where the free ends “leave” the knot. Hold it up to the light source and observe all but one diagonal of a five-point star. Do the five points determine a *regular* pentagon?

Mr. Rosenthal sent in a model to substantiate his claim. Mr. Grant submitted the following sketch of a proof:
A cute way to do this is actually to fold the thing (including making creases at DE and BC) and write down all the obvious equalities from symmetry:



$AE = AB$, $ED = BC$, angle $E =$ angle B ,
angle $D =$ angle C .

Then label each corner *on every layer*.
Then unfold. You get something like this:



(I made up the letters because my wife threw out my model when I was playing with it; she thought I should be studying for orals.) Anyway, apply "alternate interior angles, parallel lines" as much as possible, and that's it.

7 The solution of this differential equation is familiar:

$$dy/dx = y, y(0) = 1.$$

But what is the solution if one makes a slight change in the differential equation: $dy(x) / dx = y(x - 1)$, $y(0) = 1$?

Using this idea of writing equations, two other problems are suggested:

$dy/dx = y(x^2)$, $y(0) = 1$, and

$$dy/dx = y[y(x)], y(0) = 1.$$

Mr. Hoylman appears to have done the best job:

The natural thing to try would seem to be a series solution. This works beautifully for one problem, runs into a snag on the second, and looks incredibly hairy for the third. First the beautiful one.

Given the problem:

$$f'(x) = f(x^2), f(0) = 1.$$

we try to find a solution which is analytic in a neighborhood of 0, hence can be written as a power series

$$f(x) = \sum_{n=0}^{\infty} a_n x^n$$

Then the equation becomes

$$\sum_{n=1}^{\infty} a_n n x^{n-1} = \sum_{n=0}^{\infty} a_n x^{2n}$$

$$a_1 + 2a_2x + 3a_3x^2 + \dots = 1 + a_1x^2 + a_2x^4 + a_3x^6 + \dots$$

Setting the corresponding coefficients equal, we get

$$a_1 = 1, 2a_2 = 0, 3a_3 = a_1, 4a_4 = 0, 5a_5 = a_2, \dots, \text{ or}$$

$a_{2n} = 0, a_{2n+1} = a_n/(2n+1)$. Then the only non-zero coefficients are $1, 2+1, 2(2+1)+1, \dots$, which are just the numbers of the form $2^m - 1$. Then we have

$a_n = \prod_{k=1}^m (2^k - 1)^{-1}$ if $n = 2^m - 1$, $a_n = 0$ otherwise. (Someone else may be able to express that product in closed form; I couldn't.) Hence the *unique* analytic (at 0) solution to the problem is:

$$f(x) = 1 + x + x^3/3 + x^7/21 + x^{15}/315 + \dots$$

which converges for $1 \times 1 \leq 1$. We have $f'(x) = f(x^2) = 1 + x^2 + x^6/3 + x^{14}/21 + \dots$

Now try the same thing with the equation $f'(x) = f(x-1)$, $f(0) = 1$. (Incidentally, $\cos x$ is a particular solution to the similar problem $f'(x) = -f(x - \pi/2)$, but I couldn't see how to get a solution to this problem out of it.) To apply the power series method, we must make the very strong assumption that the radius of the convergence of the solution is greater than 1, so that the expansion

$$f(x-1) = \sum_{n=0}^{\infty} a_n(x-1)^n$$

makes sense. We have

$$\begin{aligned} f(x-1) &= \sum_{n=0}^{\infty} a_n[x^n - nx^{n-1} + \dots \\ &+ (-1)^n(n/2)x^2 - (-1)^n nx + (-1)^n] \\ &= \sum_{n=0}^{\infty} (-1)^n a_n + \sum_{n=1}^{\infty} (-1)^n n a_n x + \dots \\ &+ \sum_{n=m}^{\infty} (-1)^n (n/m) a_n x^m \\ &= \sum_{m=0}^{\infty} \left[\sum_{n=m}^{\infty} (-1)^n (n/m) a_n \right] x^m \end{aligned}$$

where $n/m = n!/[m!(n-m)!]$

(The rearrangements make sense because the series is absolutely convergent in a neighborhood of 0.) Comparing this with the series for $f'(x)$, we get

$$(m+1)a_{m+1} = \sum_{n=m}^{\infty} (-1)^n (n/m) a_n$$

very neatly specifying each coefficient in terms of the infinitely many that come after it. Now how do you solve something like that? (Well, you could if the series terminated, but it's easy to see that no polynomial solves the equation.) As for the third equation, I'm willing to let somebody else try to do something with

$$\sum_{n=0}^{\infty} a_n \left[\sum_{m=0}^{\infty} a_m x^m \right]^n$$

There was an even more involved discussion of this problem from R. Robinson Rowe, '18, who writes that he conducted a puzzle column in *Civil Engineering* for 19 years (thanks for the good time and yes I do enjoy the column), and there was also a solution from Mr. Grant.

8 The first, second, and third derivatives of functions are familiar, but what is a $\frac{1}{2}$ derivative, a π th derivative, or an i th derivative?

A former colleague of mine, Daniel A. Asimov, '68, has a fine solution: Fractional derivatives can be defined in several (unfortunately unequal) ways, all satisfying the natural requirement $D^a(D^b f) = D^{a+b} f$. One of my favorite ways is as

follows: Notice that $D^n(x^k) = k(k-1) \dots (k-m+1)x^{k-n}$. Now recall the generalization of factorial to real numbers, the gamma function Γ satisfying $\Gamma(m) = (m-1)!$ for m a positive integer. Since $D^n(x^k) = [(k!/(k-n)!)]x^{k-n}$, we write $D^a(x^k) = [\Gamma(k+1)/\Gamma(k-a+1)]x^{k-a}$ for any real number a . Then if a function can be defined by a Taylor series

$$f(x) = \sum_{k=0}^{\infty} c_k x^k, \text{ we write}$$

$$D^a f(x) = \sum_{k=0}^{\infty} c_k [\Gamma(k+1)/\Gamma(k-a+1)] x^{k-a}$$

The disadvantage of this method is that Γ becomes infinite at nonpositive integers so it does not work for some cases.

Also solved by Mr. Hoylman, Mr. Grant, Mr. Rowe, Mr. Rosenthal, and Donald E. Savage, '54.

9 A few readers were apparently interested in my topology problem:

Let Y be the comb space

$$Y = \{(x, y) \in \mathbb{R}^2 \mid 0 \leq y \leq 1 \text{ and } x = 0, 1/n \text{ for } n \geq 1\}$$

$$U = \{(x, y) \in \mathbb{R}^2 \mid y = 0 \text{ and } 0 \leq x \leq 1\}$$

Prove Y is not contractible relative to $(0, 1)$.

The following solution came from Barry J. Yudell, '65:

Let $f: Y \times I \rightarrow Y$ be the relative homotopy [i.e., $f(y \times 0) = y$, $f(Y \times 1) = (0, 1)$, $f(0, 1), t = (0, 1) \ t \in I$]. Now $Y \times I$ and Y are metric, and for any n , $f(1/n, 1) \times I$ is a path in Y from $(1/n, 1)$ to $(0, 1)$. This path P contains the whole "tooth" from $(1/n, 1)$ to $(1/n, 0)$, for the path is connected, and if it did not contain $(1/n, t)$ for some $t \in I$, then P would be the union of its two open subsets. Let half open seg from $(1/n, 1)$ to $(1/n, t)$ be called T ; $T \cap P$ and $[Y - (T \cup (1/n, t))] \cap P$, impossible. Now Y (and hence $Y \times I$) is compact, so f is uniformly continuous, and by ϵ, δ considerations, for n large enough, the whole "tooth" could not be contained in $f[(1/n, 1) \times I]$ as $f[(0, 1) \times I] = (0, 1)$.

Also solved by Mr. Hoylman and Mr. Grant.

Better Late Than Never

2 Captain Allan J. MacLaren, '60, has submitted a solution to this problem.

3 I have received a solution to problem 3 from Mr. Zaklad.

79 Although I personally dislike the BASIC system, it appears to have worked for Edward L. Friedman, '50, who submitted the following:

I wrote a computer program in BASIC which solves the problem by trial and error. The answer you published (18,746) was one of many possible correct numbers, the smallest being 3,121. The next five answers are shown on the computer output. Note that the program consists of 11 statements and that execution time is six seconds.

UHF
ON AT 11:28 R MON 12/04/67 TTY 50

USER NUMBER--R28000
SYSTEM--BASIC
NEW OR OLD--OLD
OLD PROBLEM NAME--PLATT
WAIT.

READY.

LIST

PLATT 11:28 R MON 12/04/67

```
100 LET S=4
110 LET N=S*S
120 FOR I=1 TO 5 STEP 1
130 LET N=(S/4)*N+1
140 NEXT I
150 IF N=INT(N) THEN 180
160 LET S=S+4
170 GO TO 110
180 PRINT "THEY GATHERED"N"COCONUTS"
190 GO TO 160
200 END
```

RUN

PLATT 11:29 R MON 12/04/67

```
THEY GATHERED 3121 COCONUTS
THEY GATHERED 18746 COCONUTS
THEY GATHERED 34371 COCONUTS
THEY GATHERED 49996 COCONUTS
THEY GATHERED 65621 COCONUTS
THEY GATHERED 81246 COCONUTS
STOP
```

RAM 6 SEC.

STOP.
READY.

BYE

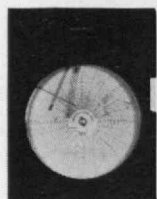
*** OFF AT 11:29 R MON 12/04/67.

81 Also solved by Mrs. Nancy M. Sheehan (wife of Bernard S. Sheehan, S.M. '61), Victor M. Harlick, Mr. Zaklad and John C. Kingery.

Allan J. Gottlieb, '67, is a graduate student in mathematics at Brandeis University. "Puzzle Review" is written for *Technology Review* and *Tech Engineering News*, the M.I.T. undergraduate professional magazine. Mr. Gottlieb's address is in care of the Department of Mathematics, Brandeis University, Waltham, Mass., 02154.

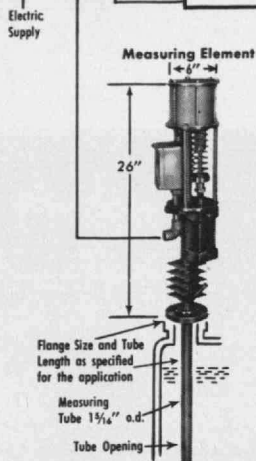
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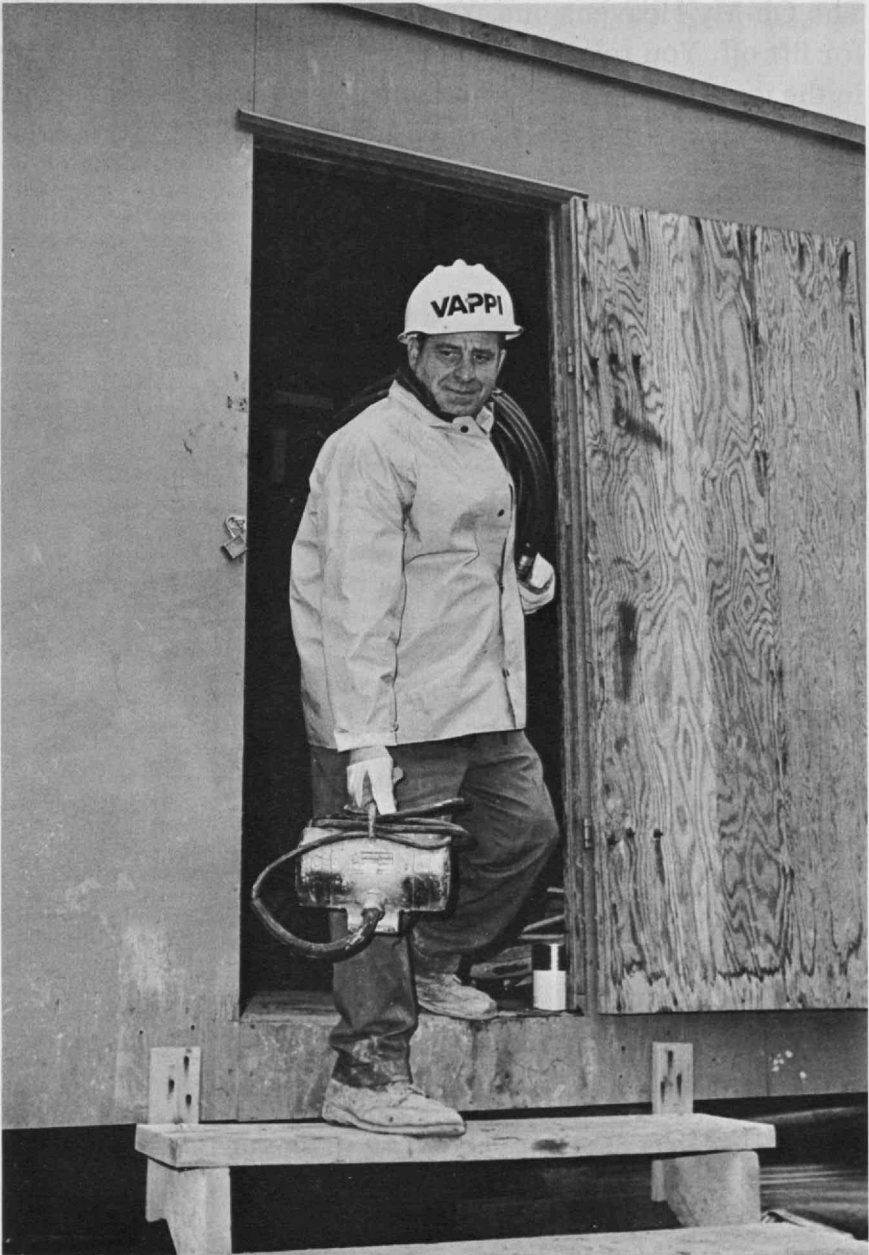


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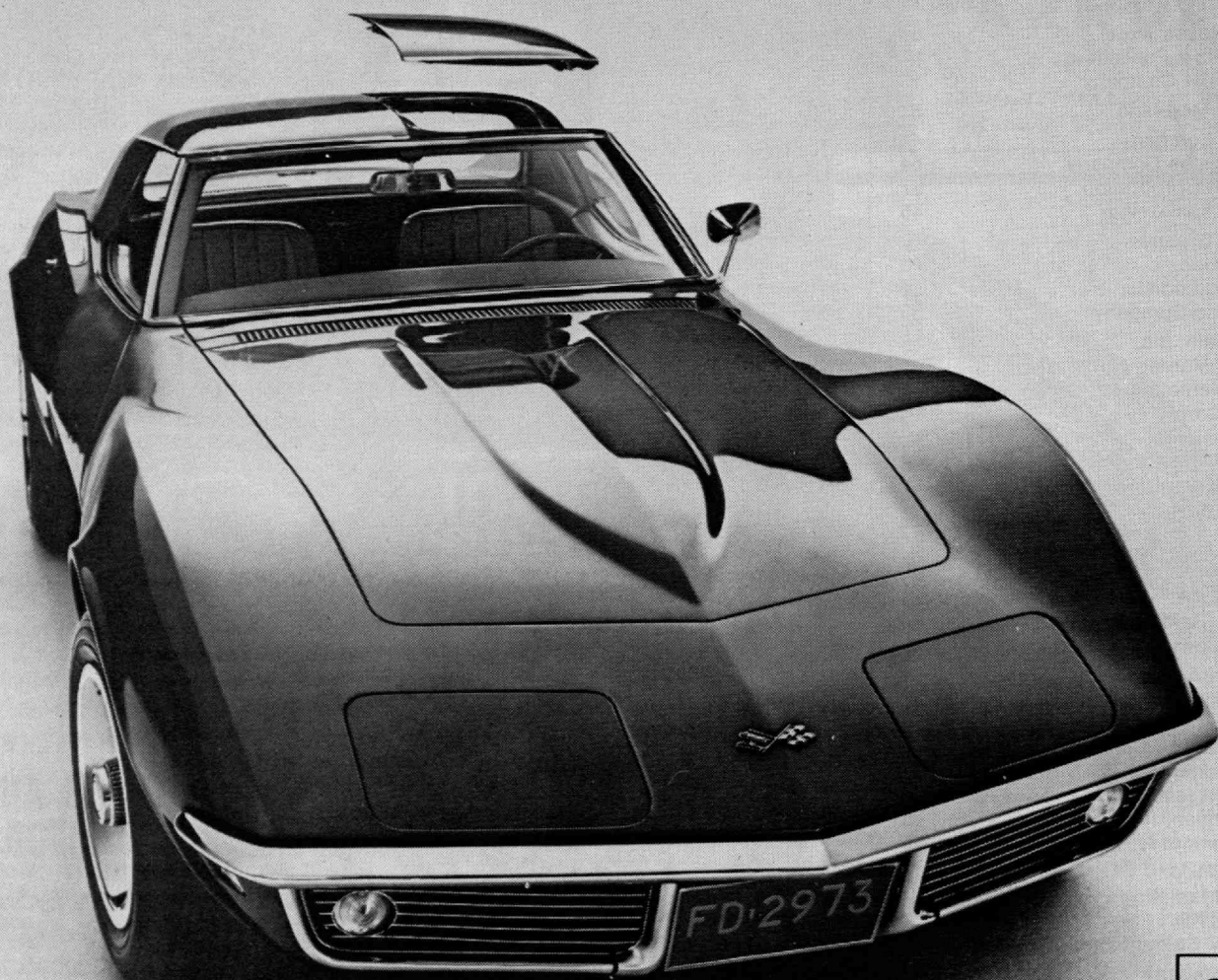
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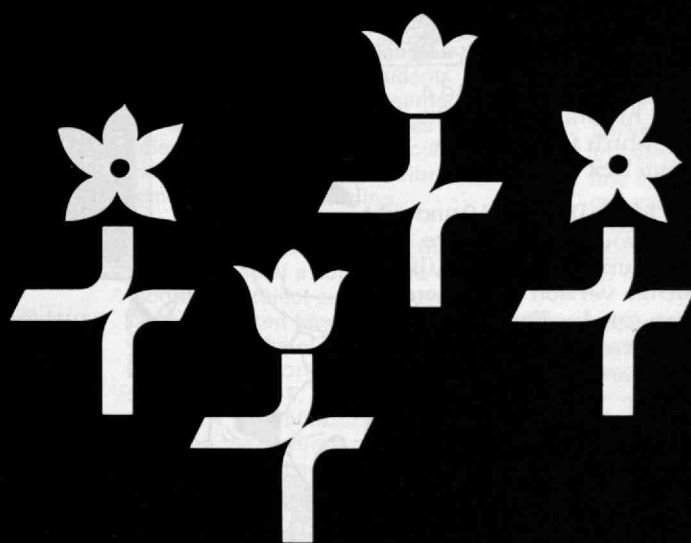
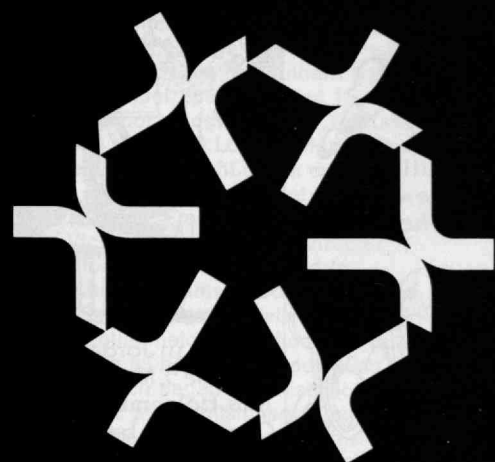


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Alumni Review



Kane on M.I.T.

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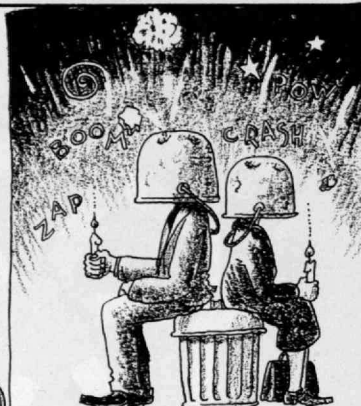
Proctor Wetherill '34, has a little sideline—a grove of 300,000 Christmas trees. Last fall he harvested over 25,000



The BUCKSNORT TROUT RANCH in Tennessee is run by Albert Del Favero '36



National Squash Singles Champion in 1967—for the sixth time (and third straight): Jim Prigoff '47

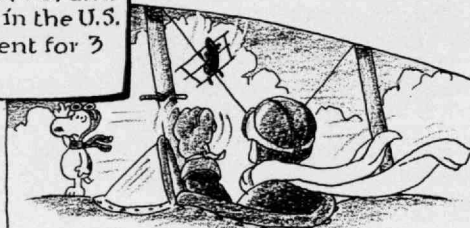


Caught in Jordan, Jerusalem, on June 5, Maynard ('04) and Mrs. Holcombe sat in the U.S. Consulate basement for 3 days under fire

Out for a new record?



In the last 18 years, Gordon Williams '29 has made engineering studies in 18 different countries

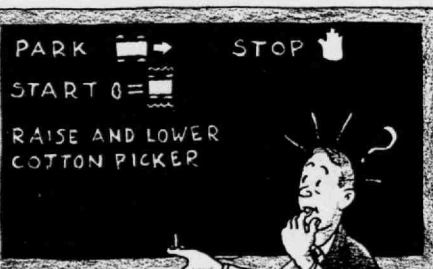
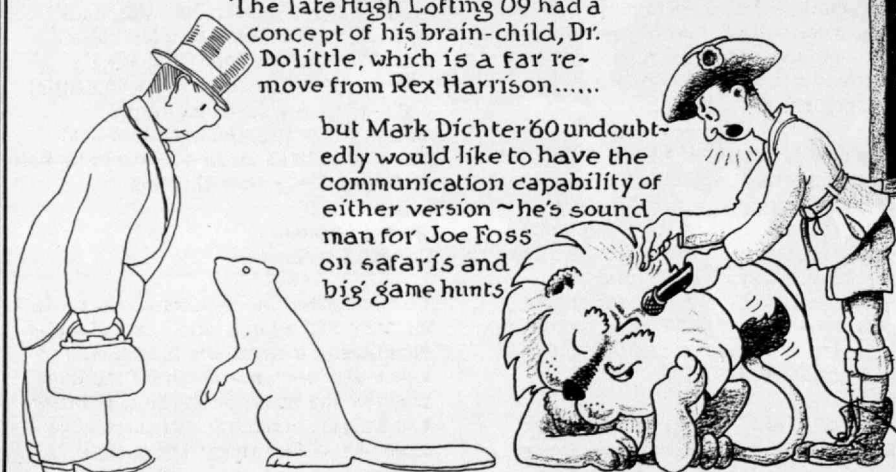


"I Flew A Camel" (not yet published), is the title of the memoirs of Mark Kinney '11. He shot at (and missed) the Red Baron the day before the Baron was finally shot down



The late Hugh Lofting '09 had a concept of his brain-child, Dr. Dolittle, which is a far remove from Rex Harrison.....

but Mark Dichter '60 undoubtedly would like to have the communication capability of either version—he's sound man for Joe Foss on safaris and big game hunts



William Purcell '38 is developing an international system of symbols for farm and industrial equipment

With many thanks to my fellow class scribes whose columns first carried these intriguing items
H.B.KANE

Alumni Review

Central Florida: Travelogue and Student Life

Amasa M. Holcombe, '04, entertained the members of the M.I.T. Club of Central Florida on December 1 with an exciting account of adventures when he and his wife attempted a round-the-world tour and became enmeshed in the Arab-Israeli War last June; and four weeks later the Club honored local students and interested aspirants at the annual Alumni-Student Christmas Breakfast. After seeing parts of France, Italy, Germany, Trieste, Crete, Egypt, and Lebanon, Mr. and Mrs. Holcombe were in the U.S. Consulate General Headquarters in the Arab Sector of Jerusalem on June 2, 1967, when gunfire shattered the upper floors of the building and the Israelis "captured" the building and its occupants. Luckily they were unharmed; in fact they were treated courteously by both fighting factions. With Suez Canal traffic blocked and much time lost, they then returned to the U.S.A.

President D. James Athan, '54, presided over the dinner meeting at the Country Villa Restaurant in Pinellas Park; to set early plans for officers for the next alumni year, he appointed the following persons to serve as a Nominating Committee: Mr. Holcombe, Harold Radcliffe, '41, Donald E. Burke, '46, and Donald J. Terp, '51.

Breakfast speakers on December 30 included Mr. Burke, Past President of the Club, who welcomed the 19 students, parents, and alumni present; Mr. Terp, who spoke of the purposes and work of the Educational Council in assisting prospective students in applying for M.I.T. admission; and Jeffrey M. Reynolds, '69, of Tampa, who spoke lucidly about student life and the unlimited opportunities for self-development in the classroom, in extra-curricular activities and in the surrounding metropolitan area. Mr. Reynolds stressed the availability to students of the very finest teaching and guidance by professors, and he spoke of the freedom of experimentation allowed students, which occasionally leads even to valuable patents.—Eugene D. Purdum, Jr. '48, Secretary-Treasurer

Southern California: Two-Dimensional Matter

A holiday season program for high school students interested in science and engineering college careers sponsored by the M.I.T. Club of Southern California on December 28 drew about 150 high school students, 10 M.I.T. students and 30 alumni to Los Angeles' Biltmore Hotel. The highlight of the event was an address on "Sweet Ignorance; on Faraday, Frogs and Freedom" by Victor Azgapatian, '47, Director of Information Sciences and Information Systems at Douglas Missile and Space Systems Division. Mr. Azgapatian held the audience in rapt attention as he wove a fascinating story which began with historical scientific accomplishments and the men who made them, touched on the current startling scientific developments, and drew implications for the world of tomorrow. In so doing, Mr. Azgapatian dramatized the importance of a questioning mind capable of discarding widely accepted rationale when real scientific breakthroughs are made.

Listeners were staggered by thoughts that matter might exist simultaneously in two time dimensions; that parallel lines may meet and cross; and that a frog's optic nerve could be severed, rotated, then rejoined and still "map" just as it did before the experiment began. There was little doubt in the minds of the attending students that much remains to be learned about our universe and that they, as students of science and engineering, would have many opportunities to contribute to tomorrow's understanding.

The first of two films shown during the program was of a sophomore engineering laboratory project aimed at using a laser to weaken hard rock. It gave the young members of the audience a taste of the kind of opportunities open to students at M.I.T. The second movie, entitled *A Tour of M.I.T.*, was helpful in giving the flavor of campus life and school facilities.

A panel of M.I.T. students and recent graduates, including Robert H. Bosler, Jr. '67, Arthur S. Warshaw, '67, Robert

Akulian, '69, and Frank Taylor, '71, discussing scholastic, extracurricular and social aspects of M.I.T., presented a highly enthusiastic view of student life at the Institute. The number of prospective students who stayed after the program to discuss specific questions with alumni and participants was encouraging. The response suggests the program was an effective catalyst in helping the M.I.T. club and the Educational Council communicate with students who are planning their college careers.—Edwin C. Bell, Secretary, 139 Annadale Road, Pasadena, Calif. 91105

Milwaukee: The Kind of Men Needed in 1980

The Annual Christmas Luncheon of the M.I.T. Club of Milwaukee, held at the University Club on December 27, 1967 to acquaint local students with the Club members, was attended by 27 alumni, students and fathers. After a short social hour and a hearty luncheon, J. Dan Harms, '48, President of the Club, introduced the panel which discussed the topic "The Kind of Men Needed in the 1980 World."

William Schield, Jr. '46, acted as Chairman with George Economos, Sc.D. '51, Raymond H. Laub, '60, and A. Lee Suker, '55, being the other panel members. The subject matter covered was the graduate's role as an engineer-manager, an engineer-salesman and a community leader. Correlation was made between the student's studies and extracurricular participation at M.I.T. and his future activities in the industrial community. A discussion period followed. It was announced that next year's Christmas Luncheon would be held on Friday, December 27, 1968.

Alumni Council: Drifting Continents

New scientific theories are rarely proved for once and all in a single, spectacular experiment; instead, the proponents of a new approach must wait for the time at which the sheer evidence supporting it is weighty enough to convince most scientists of its validity. In the view of Patrick Hurley, Ph.D. '40, Professor of

Geology at M.I.T., this point has now arrived for the hypothesis of continental drift.

Addressing the Alumni Council on January 29, Professor Hurley pointed out that the lack of an obvious mechanism whereby continents could move in a "solid" earth had previously weighted the odds against proponents of continental drift. But recent evidence from studies of ridges in the ocean floors provided geologists with a plausible mechanism of drift. Material from beneath the sea is continually emanating from ridges in the centers of the oceans and spreading along the ocean floors. Measurements of magnetic reversals in such material show that its speed and direction is exactly right to account for drifting continents.

At the same time, convincing evidence has emerged of geological similarities between continents that would have fitted together in the distant past if the continental drift hypothesis is correct. Dr. Hurley spoke of studies by an international team he has headed showing correspondence of belts of rocks in Africa and South America (see *Technology Review*, Oct./Nov., 1967, p. 57). Corresponding similarities exist between rock ranges in the Appalachians, Britain and Norway, while four periods of geological activity in New England and Europe correspond. "There is too much correlation for this to have happened by chance," Dr. Hurley stated. The recent accumulation of new evidence has, in his view, "dealt a death blow to the opponents of continental drift."

National Nominees

Eight leading alumni have been nominated to be officers of the M.I.T. Alumni Association and Alumni Term Members of the M.I.T. Corporation for 1968-1969. The nominees, chosen by the 1967 National Nominating Committee, will appear on a ballot sent to all members of the Association this month. They are:

A. Rufus Applegarth, '35, President of Aradar Corporation of Plymouth Meeting, Pa., nominated for a two-year term on the Alumni Association Executive Committee. Mr. Applegarth's M.I.T. activities include service with the M.I.T. Club of the Delaware Valley, Regional Representative of the Alumni Fund and Educational Council, and Member of the Corporation Development Committee and the Visiting Committee for the Department of Psychology.

Cecil H. Green, '23, Honorary Chairman of the Board of Geophysical Service, Inc., and Director, Texas Instruments, Inc., Dallas, Tex., to be President of the Alumni Association (one year). Mr. Green is a Life Member of the M.I.T. Corporation and (with Mrs. Green) was the principal donor of funds for the Institute's Cecil and Ida Green Building for the Center of Earth Sciences.

He has been a member of several M.I.T. Visiting Committees, is a past President of the M.I.T. Club of Dallas, and has been active in other regional and national alumni affairs.

William E. Hartmann, '37, Partner in Skidmore, Owings and Merrill of Chicago, for Term Membership on the M.I.T. Corporation (five years). Mr. Hartmann is a member of the Corporation Development Committee and has served in the Corporation Visiting Committee for the School of Architecture and Planning; he is also a Trustee of the Art Institute of Chicago, Illinois Institute of Technology, the Committee for Economic Development, and others.

Breene M. Kerr, '51, Director of Kerr-McGee Corporation and Vice President of Kerr-McGee Chemical Corporation of Oklahoma City, Okla., for Vice President of the Alumni Association (two years). Mr. Kerr is a member of the Corporation Development Committee, the Alumni Fund Board, and the Alumni Club Advisory Board, and he has been active in M.I.T. affairs in the Oklahoma area for more than 10 years. For three years before assuming his present post Mr. Kerr was Assistant Administrator for the National Aeronautics and Space Administration.

Angus N. MacDonald, '46, Partner in Braxton and Company, New York, for membership on the Alumni Association Executive Committee (two years). Mr. MacDonald is Deputy Chairman of the M.I.T. Alumni Center of New York and last year was its Vice Chairman, Activities. He is a member of the Educational Council and of the Visiting Committee for the Department of Humanities at M.I.T., and he is Treasurer and Director of the Festival Orchestra Society of New York.

Carl M. Mueller, '41, Partner and Member of the Management Committee of Loeb, Rhoades and Company, New York, to be Vice President of the Alumni Association (two years). A member of the Alumni Fund Board and of the Corporation Development Committee, Mr. Mueller has been an Educational Councilor since 1952, a member of the Visiting Committee for the Department of Economics since 1964, and active on reunion committees of his class. He is an Allied Member of the New York Stock Exchange, a Member of the New York Coffee and Sugar Exchange, Inc., and a Member of the New York Mercantile Exchange.

Henry E. Singleton, '40, Chairman of the Board and Chief Executive Officer of Teledyne, Inc., Los Angeles, Calif., for Term Membership (five years) on the M.I.T. Corporation. Mr. Singleton is a member of the Visiting Committee for the Department of Electrical Engineering; he is Trustee of two private schools in the Los Angeles area.

Gregory H. Smith, '30, President and

General Manager of Eastman Gelatin Corporation, Peabody, Mass., for Term Membership on the M.I.T. Corporation (five years). Mr. Smith is President of the Alumni Association (1967-1968), was Vice President in 1964-1965, a member of the Executive Committee in 1963-1965, and a member of the Alumni Council since 1958. He has a long record of service to public agencies on the North Shore of Boston.

Kemon P. Taschioglou, '49, Manager of Marketing Services for Teradyne, Inc., of Boston, to be a member of the Executive Committee of the Alumni Association (two years). Mr. Taschioglou has been for many years President of his class; he was Chairman of the 1967 National Alumni Officers' Conference,



A. R. Applegarth, '35



Cecil H. Green, '23



W. E. Hartmann, '37



Breene M. Kerr, '51



A. N. MacDonald, '46



Carl M. Mueller, '41



H. E. Singleton, '40



Gregory Smith, '30



K. P. Taschioglou, '49

a member of the Long Range Planning Committee on the Alumni Fund, and has been a member of the Alumni Council since 1954.

In addition to these nominees, members of the Alumni Association will vote for three members of the 1968 National Nominating Committee from among the following candidates: Richard L. Bolin, '50, General Manager of Arthur D. Little Mexico, S.A.; Alanson W. Chandler, '37, President of Chandler Engineering Company of Tulsa, Okla.; Angel A. Del Valle, '43, of B. Rodrigues and Del Valle, Inc., of San Juan, P.R.; and Phelps A. Walker, '40, Senior Vice President of Scripto, Inc., of Atlanta, Ga., representing District 8 of the Association; Milton Lief, '37, Assistant to the Executive Vice President of Alvey Conveyor Manufacturing Company, St. Louis; and Benjamin A. Oxnard, '25, Vice President of the Great Western Sugar Company, Denver, Colo., representing District 9; and Paul Gerhardt, '49, Professor of Law at Lewis and Clark College, Portland, Ore., representing District 10.

M.I.T. Club of Puerto Rico: A Busman's Holiday for the President

The warmth of the weather was matched by the welcome accorded President and Mrs. Howard W. Johnson and their family during a holiday-week trip to visit the M.I.T. Club of Puerto Rico and landmarks of the island. The dinner meeting of the Club on December 28 at the Condado Beach Hotel drew more than 80 alumni, wives, and guests including Jaime Benitez, President of the University of Puerto Rico; Senator Rafael Pico, a member of the Visiting Committee of the M.I.T. School of Architecture and Planning; and Raymond B. Hoxeng, President of the Inter-American University. Luis A. Ferre, '24, Member of the M.I.T. Corporation, introduced Mr. Johnson, and Antonia C. Kayanan, M.C.P.'42, President of the M.I.T. Club of Puerto Rico, presided. Other features of the Johnsons' entertainment on the island included touring and sailing near Fajardo on December 29 as guests of Angel del Valle, '43, an airplane trip on December 30 to visit the Art Museum and a boat ride to Caja de Muertos as guests of Mr. Ferre.

In his address to the M.I.T. Club of Puerto Rico, President Johnson described the general trend of education at the Institute today, the changes that are taking place in the form of new programs and new facilities, and the immediate and long-range aims of education at the Institute. Within the limitations imposed by the rapid social and technological changes that we are experiencing, M.I.T. is endeavouring to turn out graduates with a well-rounded education in technology, the arts, the sciences and the humanities and with a highly developed sense of personal responsibility, Mr. Johnson said. These graduates will not only be able to analyze and solve the immediate technical problems; they will

Their trip to the Caribbean as guests of the M.I.T. Club of Puerto Rico during the last days of 1967 will remain a highlight of their first years as M.I.T.'s first family for President and Mrs. Howard W. Johnson. Mrs. Johnson and the family were met at the airport by (below, left to right) Teleforo C. Carrero, '47, Rafael Fabregas, S.M. '55, Antonia C. Kayanan, M.C.P.'42, and William V. Reed, M.Arch.'33; with Mrs. Johnson in the picture are Stephen, Laura, and Bruce. More than 80 alumni and guests attended the dinner of the M.I.T. Club of Puerto Rico on December 28, where the head table included

(below, left to right) Luis A. Ferre, '24, President Johnson, Mr. Kayanan (presiding as President of the Club), and Rafael Pico. (Photos: Noel Stoute)



also be capable of helping solve today's social problems and cope with tomorrow's problems.

There followed a period of questions and answers during which President Johnson assured the alumni and their guests that although M.I.T. is satisfied with what it is now doing and with its plans for the future, it is and will remain ready to change as may appear necessary and desirable to achieve its goals. He said that M.I.T. has continued to cultivate and to expand its close relations with educational, industrial, business, government and other outside institutions not only because they constitute immediate sources of scientific, technological, management and financial cooperation and support but also because they are the principal fields of social activity into which M.I.T. graduates will flow to determine our patterns of living and to influence that of future generations.—C. S. Canals, '26, and A. C. Kayanan, M.C.P.'42.

Boston: The Spread of Curriculum Reform

M.I.T. Alumni and their wives in the Boston area had the opportunity to learn what will confront their children during school hours, at a special meeting of the M.I.T. Club of Boston on January 23, at the Faculty Club. Guest speaker for the evening was Arthur L. Singer, President of the Educational Development Center, the non-profit corporation formed by the merger of Educational Services, Inc., and the Institute for Educational Innovation (see *Technology Review*, Apr., 1967, p. 79). . . . Mr. Singer traced the curriculum reform movement back to a memorandum from Jerrold R. Zacharias, Professor of Physics at M.I.T. to James R. Killian, Jr., then President of M.I.T., in March, 1956—18 months before *Sputnik*. Zacharias noted that physics teaching seemed to be failing to instill an interest in the subject among pupils not committed to scientific careers.

As a result of the memorandum, the Physical Science Study Committee (P.S.S.C.) was formed with the object of developing a major new course for high school physics students. Today about 250,000 students take this course. A direct outgrowth of the P.S.S.C., in 1958, was Educational Services, Inc., a non-profit body which led the way in developing new school curricula in science and mathematics. . . . Mr. Singer noted that by last year it had become clear that E.S.I. had too narrow a base; under E.S.I.'s patronage the curriculum reform movement aimed its appeal very largely at respectable middle-class children. The merger which gave birth to E.D.C. had the object of restoring the balance. It did have its difficulties, commented Mr. Singer, as one might expect from "two non-profit organizations with very small assets and burning convictions."

Just how broadly based the curriculum reform movement can become was evident in a film of schools in a Washington slum area. Many of the children in the schools had lost all incentive to learn when exposed to classical teaching methods; but when they were confronted with curricula which demanded involvement and interest their attitudes changed. In learning geography, for example, by cultivating and caring for plants and animals from the regions under study, and approaching physics through simply-designed experiments, children obtain an education experience that is unfettered by the physical barriers of the classroom.

Alumni Council: New Members, New Strength

New plans to increase the size and "augment the strength" of the Alumni Council were presented to the Association's Executive Committee and to the Council on January 29 by Francis M. Mead, '29, reporting for the Alumni Council Membership Committee of which he is Chairman.

The plans, which are based largely upon recommendations of the Long-Range Planning Committee, propose that the Council be fashioned to provide "continuing dialogue" between M.I.T. and its alumni and a training ground for new leaders in alumni and Institute affairs. Its present responsibilities for governing the Alumni Association would be conferred upon a new Board of Directors, in accordance with the Long-Range Planning Committee suggestions, except that the Council would retain the power of amending by-laws of the Alumni Association.

Mr. Mead's committee recommends that the new Council membership be drawn largely from class, club, Alumni Fund and committee officers themselves, dispensing with the officially designated representatives of these groups as members of the Council. In addition, he said, there should be an open category of membership to provide

for interested alumni not currently serving as leaders of Association activities. In all, he envisioned a total nationwide membership of more than 1,000. During discussion Mr. Mead and William H. MacCallum, '24, emphasized the increased geographical distribution which the proposals would give to Alumni Council membership, and Henry R. Kurth, '21, Parke D. Appel, '22, and G. Peter Grant, '35, emphasized the importance of adequate representation of class, course, and club groups. Mr. Mead's committee will study the questions raised by the Council and return with additional recommendations in March, anticipating changes in the by-laws of the Association during the year.

Deceased

Mrs. Addie Kimball Grant, '95, June, 1966
Henry B. Bigelow, '00, December 11, 1966
William G. Blauvelt, '01, January 8
Lloyd B. Haworth, '02, December 19, 1967
Henry N. Hudson, '02, January 2
Marshall H. Washburn, '03, March 18
Stanislaus Skowronski, '04, January 10
Arthur D. Smith, '04, November 9, 1967
Leland S. Woodruff, '06, November 9
Edwin W. James, '07, December 22, 1967*
Joseph T. Mohn, '08, September 11, 1967
Louis G. Beers, '09, December 25, 1967
Edgerton M. Bettington, '09, July 10, 1967
Richard G. Tyler, '10, August 3
Edwin Upham, '12, July, 1967
Mortimer P. Allen, '13, December 7, 1967*
Albert M. Jones, '13, May 12, 1967
Robert A. Nowlin, '13, December 5, 1965*
William E. Brown, '15, January 4
Donald O. Hooper, '15, January 10
John Kelleher, '15, December 7, 1967*
Leonard E. Best, '16, December 13, 1967*
Horace Bickford, '16, December 18*
Sidney J. Judson, '18, June 13, 1967
Thomas P. Kelly, '18, January 7
Wirt R. Robinson, '18, July 13
Leslie Thorpe, '18, December 17, 1967
A. Lionel Reid, '19, October, 1967*
Theodore H. Best, '20, January
Rollin S. Baldwin, '22, December 13, 1967
Richard E. Downing, '22, January 26
Bernard L. Chapin, '23, January 15
Harold H. Leary, '23, January 6
John P. Brosnan, '24, October 23, 1967
Frank C. Gilson, '24, January 3
Ernest L. Baxter, '26, January 12
Joseph C. Huske, '26, December 21, 1967
Allen L. Willis, '26, December 22, 1967
Donald L. Ross, '27, November 18, 1967
Harold H. Staebner, '27, December, 1967*
Sidney B. Jewett, '28, November 8, 1966
Fisher Hills, '29, December 26, 1967*
Bronislaus Gedrewicz, '31, December 24
Frank M. Ikuno, '32, February 10, 1967
David H. Little, '33, September 3, 1967
Harold C. Downes, '34, December 26
Leonard S. Leventhal, '42, December 26
Milton P. Link, Jr., '42, December 11
Hugo M. Wikstrom, '50, July 13, 1967
Jean L. Blanchet, '60, February, 1967
Kenneth Kushmer, '66, October, 1965
*Further information in Class Review

Alumni Calendar

Philadelphia-Wilmington—M.I.T. Delaware Valley Conference, "Technology,

Tomorrow, and You" on March 9 at the Sheraton Hotel: Howard W. Johnson, President of M.I.T.; James R. Killian, Jr., '26, Chairman of the M.I.T. Corporation; Irwin W. Sizer, Dean of the M.I.T. Graduate School; Alfred Keil, Head of the M.I.T. Department of Naval Architecture and Marine Engineering; D. Secor Browne, M.I.T. Associate Professor of Flight Transportation; Robert W. Mann, '50, M.I.T. Professor of Mechanical Engineering.

Boston—luncheon at the Union Oyster House on March 14: John Bush, Vice President of the Millipore Corporation.

New York—repeat session of the Introductory Computer Seminar at the I.B.M. Product Display Center on March 14-15.

Mexico—Annual Fiesta of the M.I.T. Club of Mexico on March 14-16 in Mexico City. Registration, luncheon and evening program at Pyramids of the Sun and Moon at Teotihuacan on March 14; luncheon trip to Texcoco and American Mexican Annual Address on March 15; Noche Mexicana, the major event, on March 16. Visiting Alumni are welcome.

Northern New Jersey—concert by the M.I.T. Symphony Orchestra at Montclair State College at 8:30 p.m. on March 25.

Chicago—concert by the M.I.T. Symphony Orchestra at George Williams College, Downers Grove, on March 29.

Dallas—M.I.T. Southwest Conference, "The City in the Year 2000" on March 30 at the Marriott Motor Hotel: Howard W. Johnson, President of M.I.T.; Gregory Smith, '30, President of the Alumni Association; John E. Burchard, '23, Professor of Environmental Design, University of California (Berkeley); Walter A. Rosenblith, Chairman of the Faculty; D. Secor Browne, M.I.T. Associate Professor of Flight Transportation; John F. Collins, M.I.T. Visiting Professor of Urban Affairs (former Mayor of Boston); Arnold E. Amstutz, '58, M.I.T. Associate Professor of Management.

New York—luncheon meeting on April 5: Julius A. Stratton, Chairman of the Ford Foundation, M.I.T. President Emeritus, and Chairman of the President's Marine Sciences Commission.

Cambridge—meeting at M.I.T. on April 5 for Club Presidents: Howard W. Johnson, President of M.I.T.

Boston—luncheon meeting on April 11 at the Union Oyster House: Mrs. Karl T. Compton.

Boston—Annual Meeting at the Union Oyster House on May 9.

Cambridge—class reunions on June 7-9 and Alumni Day on June 10.

Cambridge—Alumni Seminar on September 7-9.

Class Review

95

We are glad to report that **Luther Conant**, who is in a nursing home in Norwalk Conn., celebrated his 95th birthday in December. He finds enjoyment in the newspapers, news and politics. He has a great-grandson and a great-granddaughter.

Charles Berry, who lives in Lexington, is 95 years young and enjoys automobile drives with his family.—**Andrew D. Fuller**, 1284 Beacon Street, Brookline, Mass. 02146

96

There were two responses to Christmas cards sent to each member of the Class. One from Orlando, Fla., where **George Harkness** is enjoying his usual winter vacation right in the middle of the orange groves. The danger of frost is an annual fear that is endured.

The second answer was from Thomaston, Maine where **Richard Elliot** lives and continues his banking position. He has promised to write a story of his business interests, and I hope of his sailing off that rock-bound coast. The notes will carry the story. He was out sailing late in the fall and must have had some very interesting experiences. He was in Course IX with the Hedges and Henry used to ask frequently if there was any news from him.—**James M. Driscoll**, Secretary, 129 Walnut Street, Brookline, Mass. 02146

97

The living members of the Class of 1897 are: Frederick S. Atwood, William Binley, Charles R. Currier, Charles W. Dunn, Amos E. Gillespie, Edgar M. Hawkins, Walter Humphreys, Fredrick Hunnewell, William D. Parker, Carl W. Sharer, Jay E. Tone and George R. Wadleigh.

George Wadleigh writes: "My activities have been much restricted due to my poor eyesight and ambulatory deficiencies. **Will Binley** and **Edgar Hawkins**

are the only ones I ever hear from. They both seem to be well and active." . . . Anyone wishing to report news, please send it directly to the *Technology Review* Office.

98

The daughter of **Fred B. Dawes** wrote that he is in very good health and that he walks downtown and back (Hudson, Mass.) every day in good weather. He also attends the Unitarian Church regularly and still serves as Moderator there, something he has done for over 40 years. He is active in the Legion Post and the Hudson Historical Society and he accompanies his son, Robert Dawes, '26, to Alumni Council meetings almost every month. He still lives in the family mansion built by his grandfather in the 1890's. He makes a yearly visit to his favorite place, Pemaquid Point, Maine, where he has maintained a summer home for many years and now turned over to his children and grandchildren. Fred's son, Robert, is President of Thomas Taylor and Sons in Hudson. He is also President of the Hudson National Bank and active in various civic organizations. He married Evelyn Lipscher and they have a son, Thomas, employed with his father, and a daughter, Mrs. Richard Bailin of San Francisco.

Thank you, Mary Dawes Steele, for the newsy letter. Mary is Mrs. Julian D. Steele of Crane Neck Road, West Newbury, Mass. She is a long-time teacher, employed now at the laboratory Pre-school of Bradford Junior College. Her husband is Commissioner of Urban Renewal for the state of Massachusetts. They have one daughter, Mrs. Roderick Ireland of New York City.—**Mrs. Audrey Jones Jones**, Acting Secretary, 232 Fountain Street, Springfield, Mass. 01108

99

Philip Burgess is in good health and is planning a two month trip to Florida and sends hearty greetings to all. . . . **Conrad Loring** is in good health. . . . **Walter Wells** says: "I am able to get around on my own feet." . . . **Hervey Skin-**

ner is continuing his good deeds for the welfare of M.I.T. . . . Our charming **Miss Eugenia Frothingham** sent good wishes from her throne of 94 years.

Among the travelers are **Carroll Brown** who went to Cleveland where he lived for 34 years; **Fred Grover** who inspected the locks of the Panama canal; and **Norman Seavey** who told about a store in St. Augustine with a blacksmith forge. . . . We were honored by cards from Don Severance, Fred Lehmann, James Driscoll, '96, President Howard Johnson and the *Technology Review*. The Class of 1899 has 17 names on its active roll and all are doing their share to help keep our ship on an even keel in this world of storms.—**Percy W. Witherell**, Secretary, 1162 West Street, Wrentham, Mass. 02093

02

Belated notice has been received of the death of **Henry H. Saylor** of Huntington, Long Island on the 22d of August, 1967. Saylor was a Fellow of the American Institute of Architects, this award having been conferred on him in 1951. To quote from the award speech "He is known as the dean of architectural editors. He has been associated with leading architectural magazines for 45 years and is founder and present distinguished editor of the *Journal of the American Institute of Architects*. Saylor served his architectural apprenticeship as draftsman with Cope and Stewardson and E. V. Seeler, Philadelphia, then turned to journalism and was editor, successively, of the *Architectural Review*, *Country Life in America*, *House and Garden*, *Architecture*, and associate editor of *American Architect* and *Architecture*. He was the founder, editor, and publisher of *The Architects' World*. This magazine was absorbed by *Architectural Forum* of which Saylor was associate editor. In 1944 he became editor of the *American Institute of Architects* and so continued until 1957 when he retired from the editorship to write *The History of the American Institute of Architects*. Saylor was the author of a number of books: *Bungalows*, *Making a Rose Garden*, *Making a Fireplace*, *The Book of Annuals*, *Tinker-*

ing with Tools, and *The Dictionary of Architecture*. He edited the following books: *Distinctive Homes of Moderate Cost*, *Inexpensive Homes of Individuality*, *Architectural Styles for Country Homes* by Aymar Embury, and *Collecting Antiques for the Home*. It is of interest that Saylor started his journalistic career as editor of Tech at M.I.T.—

Burton G. Philbrick, Secretary, 18 Ocean Avenue, Salem, Mass. 01970

03

It seems to your Secretary that as a preliminary to the class news our classmates who are living in more temperate climates might be interested in the fact that recently in Cambridge we had the coldest days we have had in 11 years. It all started usually enough with the customary snowfall but as the day progressed the temperature fell and we had high velocity winds of 40 to 50 miles per hour. The next morning the temperature was minus three degrees at Logan Airport, and the snow continued. Great drifts of snow covered the house tops and parked cars making it difficult for the city plows to operate. Our poet Whittier, who wrote of the lovely winter snow, was comfortable beside the heat of an open fireside but would not have enjoyed four irksome days of below zero temperatures and mocking sun which offered no heat.

The Christmas season brought news from **Bob King, III**, **Scotty Morse, I**, and our Emeritus Professor **Andrey A. Potter, VI**. Robert is still active in his laboratory at Norwalk, Conn., and claims he has never been as busy. With the help of Mrs. King he continues as Chairman of Trustees at Piedmont College in Georgia. Bob calmly asserts that he has "no spare time for mischief."

While visiting my son John and his family in Kentucky at Christmas I was able to plan a meeting with Howard Morse (Indianapolis, Ind.) and Andrey Potter (Lafayette, Ind.). We first discussed the epochal meeting by telephone. John and I drove three and a half hours, a scenic trip, before we reached Howard's. It was a warm reunion. Scotty has gained weight and is living a healthy and composed life of retirement after such a strenuous career. Since the death of his devoted wife Scotty has been living alone in his spacious and attractive house. We enjoyed seeing the souvenir pictures of his boyhood days in Dedham, Mass., and took some photos so we would have something to remember this special "reunion" by.

After leaving Scotty's we drove to Lafayette where Andrey was eagerly awaiting our arrival. Mrs. Potter gave us a wonderful reception. Since they sensed that we had a long journey back to Kentucky we were at once seated. Eva still retains her warm-heartedness and the dinner was sumptuous. Gaiety prevailed as Andrey

told jokes about Roger's attendance. We made a brief visit to Andrey's campus, visiting the college building where Andrey's desk is located. There were files full of innumerable degrees and citations of merit which he had been awarded. There was picture taking also—Eva, Andrey and I wanted an ever present memory of the occasion. Crossing the campus we met several of Andrey's neighboring professors. They completed the picture of Purdue University being a warm and friendly place. The trip and the reunion of old M.I.T. classmates is something we will remember for quite a long time. I would like to add that the Indiana Society of Professional Engineer now has a chapter which is called the A. A. Potter Chapter.

It is with deep sorrow that I report the death of our devoted and ever enthusiastic classmate **William M. Gilker, VI**, from Dallas, Texas. Bill, who was 86, was prominent at our 60th Reunion. In 1945 he retired from the Southern Bell Telephone Company where he had worked since his graduation from M.I.T. As Traffic Supervisor for Southern Bell Bill lived in New Richmond, Quebec, Canada and then in Texas where he stayed for more than 50 years. He was Chairman of Trustees of the Oak Lawn Methodist Church and a member of this congregation for over 50 years. He is survived by a son, William M. Gilker, Jr., a daughter, Mrs. C. H. Webb and five grandchildren.—**John J. A. Nolan**, Secretary, 13 Linden Avenue, Somerville, Mass. 02143; **Augustus H. Eustis**, Treasurer, 14626 Canton Avenue, Milton, Mass. 02186

04

In a recent issue we quoted from a most interesting letter we received from our classmate **Maynard Holcombe**. Mrs. Hayward received a letter shortly before the holidays which told of the Holcombes' further travels. I am glad



William M. Gilker, '03

to see that one of our classmates is still doing some traveling. "We flew back home reaching Tampa July 7 after 71 days of travel, 23 of which were on cruise ships and about 10 hours in five flights by jet plane, during which we saw 13 foreign countries. In August our Rambler was demolished in a six car chain collision on the Howard Frankland Bridge, but we were not injured (thanks to seat belts) 'tho we had to buy a new car. In September we flew to Philadelphia, Pa., for Susie's wedding to Bruce Cox. He is a student officer in the Air Corps now in Del Rio learning to fly. We visited Bruce in November on a trip to Mexico from San Antonio, where we spent Thanksgiving with Margaret and Betsy's families. We were all together with their four children for the first time in their little lives—a most happy occasion for all of us. I had my 85th birthday in October but I am still going strong, and we continue to play up to nine holes almost every day."

Also in a recent issue we mentioned an article in *Vogue* magazine on **Mrs. Stanley McCormick** (Katherine Dexter). We regret to have to report in this issue of her passing. The following is



Andrey A. Potter, '03, Purdue Dean Emeritus (center), who was Dean of Engineering at Purdue University from 1920 to 1953, has been honored by the former Lafayette chapter of the Indiana Society of Professional Engineers. The chapter, formerly named for the French general Marquis de LaFayette, was renamed the A. A. Potter chapter in honor of the

nationally renowned engineering educator. At the recognition dinner Dean Potter chats with Professor Lawrence Kramer (left) of the Purdue School of Electrical Engineering, chapter President, and Dr. George A. Hawkins, (right) Vice President for academic affairs and former dean of engineering.

from a local newspaper clipping. "Mrs. Stanley (Dexter) McCormick of 393 Commonwealth Ave., Boston, an 1893 Boston debutante, died December 28 at her home at the age of 92. She was the widow of Stanley R. McCormick, youngest son of Cyrus McCormick inventor of the reaper and founder of the International Harvester Company. A graduate of M.I.T. in 1904, she was a member of the Chilton and College clubs of Boston, and Colony Club of New York and the Contemporary Club of Chicago. Until the death of her father, Wirt Dexter, she lived in Chicago and then came to Boston where she attended Miss Hersey's School on Beacon Hill. Dexter ancestors were residents of Boston since 1642. In 1962 she gave her home in Switzerland to the United States government as a residence and conference center of U.S. officials to the United Nations and International Organizations in Geneva." Mrs. McCormick left the bulk of her \$30 million estate to M.I.T. The exact sum that M.I.T. will receive is unknown, but her attorney, Mr. James Black, said it is expected to exceed substantially the \$5 million she left to Stanford University and to the Planned Parenthood Federation of America. . . . We have one more death to report, that of **Arthur D. Smith** of Orangeburg, S.C., but no further details. . . . By the way, our class treasury is getting pretty low so if any of our classmates are so inclined, contributions would be gratefully accepted.—**Eugene H. Russell, Jr.**, 82 Stevens Road, Needham, Mass. 02192

05

The sequel to the second paragraph of the February issue regarding the illness of **Converse Smith**, I, is contained in a letter from his daughter, Mrs. John Stockton of Fayetteville, N.Y., in which she says that her father died on December 13, 1967. He was with the New York, New Hampshire and Hartford Railroad for many years and spent most of his life in Connecticut. . . . **Doc Lewis**, X, was one of 10 V.I.P.'s appointed by the American Institute of Chemical Engineers to select the 10 outstanding achievements of chemical engineering. It seems quite fitting that Doc was included as I seem to remember that Doc has long been known as the "Father of Chemical Engineering" as a college course. If you wish to know what these 10 achievements are, write to American Institute of Chemical Engineers, 345 East 47th Street, New York, N. Y. 10017, or, I'll lend you my copy. . . . Notations on Christmas cards give brief information but at least tell us that the senders are alive and able to select some very fine sentiments. **Harry Charlesworth**, VI, explains his failure to visit the Secretary this past summer; it seems that one road sign got turned around and he landed back in Massachusetts. Don't get lost again, Harry. . . . **Bill Spalding** and Alice again apologize for not visiting friends and relatives in New Hampshire but promise us a visit in

1968. They did get to Fort Lauderdale, Fla., "but too late to join in the beatnick doings." I wonder how Bill would look with a beard.

At the risk of having him come back at me, protesting at my past attempts to make him Superman, I insist that **Erret Graham's** stories prove him to be our "Mr. Hardy." Listen: "I find plenty to do here on the place, which is about $\frac{3}{4}$ of a mile long and $\frac{1}{4}$ mile wide. Just now I'm working on a road across the north end and am at it with pick and shovel and wheel barrow every day it is not raining. I'm well aware that is not the modern way to make a road. I ride my bicycle to and from work. I fly over to commissioners meetings at Friday Harbor now, instead of going by canoe as usual, as the canoe trip requires $1\frac{1}{2}$ to $1\frac{3}{4}$ hours and start has to be made in the dark. We'll resume the canoe trips when the days get longer. Daylight now is about 8 a.m. to 4:30 p.m. Some friends of ours here on Shaw treated us to an airplane ride to and around Mt. Baker a few days ago. We circled the 10,750 feet dazzling white jagged peak at about 12,000 feet taking only $1\frac{1}{2}$ hours for the round trip." . . . **Sam Seaver** says: "I'm going strong. It was a great treat to have had our whole family, including 10 grandchildren, sit down to turkey with us on Thanksgiving Day. Remember me to all '05ers." . . . **Charlie Mayer**, IV, is bragging about the arrival of his first great grandchild. Those who attended our 60th Reunion will remember the grandparents, the Gows of New Jersey. . . . **Herman Eisele** writes: "I am getting out and around after my cataract operation on one eye, but must use caution. My vision is limited. I go to my office five days a week. Am still doing a little professional work of the type which I can handle at my office. Am riding the buses which I don't like, but I cannot see well enough to drive. Otherwise, except for a number of minor indispositions, I think I am normal for my 85 years."

Herb Bailey's regular Christmas letter gives a lot of information about his happy family and then of himself: "Do you remember the old hymn, 'Count your many blessings see what God hath done?' Since Christmas commemorates the advent of God's greatest blessing to us, it is a good time for an old man to count his blessings. Thus, I'm afraid my holiday greetings will turn out to be a counting of my blessings rather than just a wishing of happy merriment for you. This year has brought much for which I am thankful, in spite of the four midnight hours doctors worked inside of me at the hospital. One of them told me when he realized how rapidly I recovered, 'You are ten years younger biologically than chronologically.' Now isn't that something to be thankful for? I still have occasional aches and pains, but I'm not yet in an old folks home and my dear daughter Lucy and her husband seem to really enjoy having me around to feed the cats and dog and wind the clock. Pottery making, reading and letter

writing, football and Perry Mason on TV and stamp collecting keep me busy and thus happy. Early this year I resigned from the county school board and since have been honored at a dinner and presented a bronze plaque by the Herbert Bailey School for Boys. This is one of the two schools for problem children directly under the board's control. The other was named for a county superintendent when he resigned. I am thankful to be in such good delinquent company and for the happy years spent with the county board."

Pat Sullivan (formerly of Aroostook County, Maine, now at 42 Seeward Avenue, Toms River, N. J.) says: "We remain normally active. We still play a fair hand at bridge and belong to a 16 couples bridge club. Time does not drag heavily with us and we both seem to be busy all the time. My only worry is my hearing which continues to get worse. Although when I retired I was made an honorary Rotarian, I have stopped going to Rotary Meetings because of the difficulties I encounter in trying to follow conversations in a crowd. One lost word can cause much embarrassment." I can't quite understand Pat's N.B.—"If you do not receive this letter, please let me know." Pat, if you read this about March 1, I did. . . . I hereby acknowledge receipt of Christmas cards from Peg and **Bill Ball** (sojourning in Florida), Mabel and **George Prentiss**, Grace and **Roy Allen**, Eleanor and **Lloyd Buell**, Isabel and **Charlie Smart**, Jane and **Bob McLean**, Harriet and **Huntington** (the last of our eight Smiths), Dorothy and **Fred Poole**, Helen and **Hub Kenway**, Helen and **Dean Klahr**, Edith and **Bob Luce**, Elizabeth and **Gilbert Tower**, the **Bob Adamses**, the **Art Balkams**, **Gil Joslin**, **Henry Buff**, **Bert Files**, **George Rhodes**, **Izzy Nye**, **Wallace Taylor** and **Walter Eichler**. We can assume, from lack of specific information, that they are all happy and well (considering), and wishing to hear from some of their old classmates at "Tech on Boylston Street." . . . Change of address—**Leslie Clough**, 125 Broad Street, Weymouth, Mass. . . . We are looking for a candidate for Assistant Class Secretary. **Gilbert Tower** feels that he cannot continue. I'll promise not to be too tough a boss on whoever is willing to take on the not too heavy duties.—**Fred W. Goldthwait**, Secretary, Box 32, Center Sandwich, N. H. 03227

06

In the February notes the number of living classmates was reported as 108. Since then the Alumni Office has sent me their list, with addresses and zip numbers—a total of 111—107 men and four coeds. We are grateful to many of those 111 for Christmas cards and messages. Some fellows had been having trouble. **Stew Coey** was back to normal by September after an operation in July, and Betty was in the hospital in Bennington for about

10 days in November. . . . **George Guernsey** likewise was out of circulation for nearly four months last summer and fall but "it is a delight to live here (Sarasota) among friendly people and pleasant surroundings." . . . **Andy Kerr** is well over 90 and his handwriting shows it. Our address was typed, but above it Andy had written our names and God Bless You Both. . . . **Jack Norton** and Margaret got to New England last summer for a brief visit. He likes Tryon where they "live along like all the other old people." . . . **Frank Benham** had no luck trying to contact us last summer when he forsook Daytona for New England. Mary and **Harry Fletcher** not only sent us a card but also a box of candy—the hard kind that last and last, so we will think of them often! . . . **Bill Abbott** admits that "our M.I.T. line gets thinner and more scraggly (look that up) but we can always hope for the same old vigor"—some of it anyway, Bill! . . . Frances Fuller (Mrs. Floid) sent me a reel of 8m.m. movies which was taken at Harwichport—Snow Inn—in 1951. She had previously sent the slides, which we saw at the 1966 Reunion, but didn't then find the movie reel—"it was with some of the children's." Frances expressed it quite nicely when she adds—"I am as well as can be expected—broke my right wrist last January ('67) and it still bothers me."

Bob Cushman has been hospitalized four times but now he walks a mile or so every day and drives his car. He sees his wife, Ruth, for about five hours every day. She has been in a rest home for over two years. Last fall Bob entertained **Fay Libbey** and **Henry Mears**—two retired miners also living in or near Portland, Ore. In his message Fay referred to Henry Mears and **Guy Ruggles**. Not having heard from Guy recently, I have just talked with his sister Helen in Reading. She thinks the reason may be because Guy is in the hospital, with some kind of an infection we believe, and hopes that by now Guy is back to normal. Henry Mears thinks that "maybe sometime I will get there in June again." He was with us on Alumni Day a few years ago. . . . **Jim Wick** wrote that he and Clare are restricted on a stabilized plateau, but at 85 Jim says he gets in two hours of effective work every day. **Howard Barnes** put it another way—"It looks now like a mighty long way back to 1906." . . . Bertha and **Sherm Chase** expressed the hope that we would meet more often in the coming year, and as a New Year Wish quoted an Old English Blessing—"God Bless thy Year—thy coming in—thy going out—thy traveling about—the rough—the smooth—the bright—the drear—God bless thy year." That is our wish for all of you too. . . . The death of **John Hutchins Cady** on September 27, 1967, was reported in the February notes with a partial career. A lengthy obituary has since come to hand and here are some quotes. During W.W.I he served with Battery

A.R.I. National Guard and attended a Field Officers' training school in 1918; served on committees on air raid shelters in 1934; was appointed by the National Planning Board as Federal Consultant of the State Planning Board. He was long active in restorations and better housing programs; was a tireless student of Rhode Island's past; his historical research resulted in numerous articles in publications of the Historical Society as well as other groups and in magazines and newspapers. He was the author of numerous books and a member of, or officer in, 15 or more societies and associations. All his life he was the President of his class of 1903 at Brown. John H. Cady lived a long, eventful and fruitful life. He must have felt that it was a rewarding life too.

Another long, eventful and fruitful life has ended. **George William Burpee**, I, S.B. (A.B. Bowdoin), died November 7, 1967, probably in Bronxville, N. Y., where he and Katherine had been living for the past few years at Alger Court. George was born November 9, 1883, in Sheffield, New Brunswick, Canada, but the family soon moved to Houlton, Maine, which was his home address during the two years he was with us, after getting his degree and Phi Beta Kappa at Bowdoin in 1904. His varied interests and activities were evident during those two years. He was a member of the C. E. Society, Technology Club, Mandolin Club, and Class Day Committee. George soon became busy in railroad engineering first with the Laona and Nothern, and in 1911 on the construction of the Canadian Northern Ontario Railroad. For a few years he was in the field with an engineering company doing plant appraisals, and in 1921 started a life tenure with Coverdale and Colpitts, soon becoming a partner. During the past few years he was retained as a consultant. While with C. and C. his "responsibilities included the valuation of railroad and industrial properties; numerous studies made for railroad consolidations and reorganizations; mass transit facilities, and for estimates of traffic revenue for more than 200 projects including bridges and express highways." Through the years George has been a director and/or officer of several professional societies, also in Bronxville he had been the president of the Community Fund; a senior warden of Christ Church; member of the Board of Education, the Planning Commission, the Board of Zoning Appeals, the Board of Governors of Lawrence Hospital, also a Trustee of the Cathedral of St. John the Divine in New York City and member of the board of trustees of Bowdoin College, which awarded him a degree of Doctor of Science in 1939. He was the second member to receive the Award of Merit presented by the American Institute of Consulting Engineers and had previously been awarded an honorary membership in the American Society of Civil Engineers. It is hard to stop telling about the life

of George Burpee, as I said above, a long, eventful, and fruitful one.—**Edward B. Rowe**, Secretary-Treasurer, 11 Cushing Road, Wellesley Hills, Mass. 02181

07

A note from **Jim Barker**, received shortly after Christmas, contained an obituary notice he had cut from the New York *Times* of December 25, 1967 telling of the death of **Edwin W. James**, I, of our Class on December 22, 1967. I immediately wrote a letter of sympathy from the Class and sent it to his daughter, Miss Alice James, with whom he lived. Many of us will recall Ed for his activities in connection with the Tech Shows. He wrote many of the lyrics for the 1906 show, and the book and lyrics for the 1907 show. He was also associated with the student newspaper, *The Tech*. Ed was one of the older men of the Class and was 90 at the time of his decease. He attended Harvard before coming to M.I.T. Upon graduation he went to the Philippines and was District Engineer for the Bureau of Public Works in Manila from 1907-1909. Ed was then appointed Highway Engineer with the United States Bureau of Public Roads in 1910 and remained with this Bureau until his retirement in 1953. For 20 years Ed was Chairman of the Standards Committee of the American Association of Highway Officials. He was also Chairman of a committee representing the Bureau of Public Roads and the various individual states in laying out and correlating the original Federal-Aid Highway System. A frequent writer for technical publications, his book *Highway Construction and Finance* was translated into 17 languages.

Early in January I received notice from the M.I.T. Alumni Office telling of the death of **Franklin O. Adams**, IV, on November 27, 1967. At the time of his death he was living at 2921 South Orleans Avenue, Tampa, Fla. As is my custom, I wrote immediately to his family expressing the Class' sympathy and asking for any information available. As of sending these notes to the printer, I have had no reply.

Frank came from Locust Ridge, La., and had received his B.S. Degree from Centenary College, Louisiana, before coming to M.I.T. His thesis was a "Design for a Country Residence in the South." Perhaps some of the Course IV architects can add to this very meagre information I have about Frank. . . . In one of the recent *Technology Reviews*, I mentioned receiving an Obituary notice for Dr. Robert B. Sosman, '04, who received his Ph.D. Degree in 1907. I communicated with the *Technology Review* office and they have now agreed that the obituary should be published in the Class of '04 notes.—**Philip B. Walker**, Secretary and Treasurer, 18 Summit Street, Whitinsville, Mass.; **Gardner S. Gould**, Assistant Secretary, 409 Highland Street, Newtonville, Mass.

We were more than happy to receive a news release from the American Society of Mechanical Engineers stating that among the several major awards for engineering achievement presented at the Winter Annual Meeting, the A.S.M.E. award for distinguished service in engineering and science is going to **Mayo D. Hersey**, specialist in aeronautic instrumentation and visiting Professor of Engineering at Brown University. The Class congratulates Mayo on this high honor. We hope to receive later the actual account of the presentation of the award. . . . **Art Shaw** received the following from **Edward D. Merrill** from Washington, D. C. "You may not know that **Morse Rew** was a classmate of mine at Grinnell College in Iowa, Class of 1907, as well as being M.I.T. 1909. Grinnell makes awards to alumni at the 10 year class reunions and Morse was given one last June. I thought it might be appropriate to add this to our class records! You are generous to give your time to the Class Agent job!" The Notice of Alumni Awards, 1967, from Grinnell College opens with "I've been just another engineer", says Morse W. Rew, but his record of accomplishments since graduation in 1907 proves that he has been outstanding in his field." After receiving his B.S. degree from M.I.T. he continued as an instructor in civil engineering. He then became a bridge designer in New York City and Boston, designing the two largest drawbridges in New England. However, his real career was the design and development of rapid transit systems for Boston, Cincinnati, Pittsburgh, and Cleveland, although at one time he was acting as district engineer for the Emergency Fleet Operation of the United States Shipping Board. Most of Mr. Rew's life was spent in Cleveland. From 1922 to 1955 he was with the Cleveland Transit System where he started and organized the Coach Department, acted as general superintendent of the Cleveland Railway Company, and in 1943 became chief engineer in full charge of planning, designing and constructing the 13-mile Cleveland Rapid Transit System. He retired in 1955 at the age of 70. He is cited as "having played the most important part in developing the first new rapid transit system in the United States in many years." His time-consuming activities have not prevented him from maintaining his affiliations with Cleveland's Old Stone Church, the Cleveland City Club, Cleveland Engineering Society and the Masons. The Class also congratulates Morse on having merited this award and is proud that two of its members have been so honored.

Just a short item from **Joseph Dort**, who now lives in Keene, N.H.: "Retired status; very little action except to aid my wife to keep the home fires burning." . . . In the February notes we told briefly of the death of **Haylett**

O'Neill. A note from his wife **Ethyl** published in the January *Technology Review* told of his illness for over a year (he was in a hospital), and reported that he had good days and bad ones. Just after the February notes were received at the *Review* office, we received a letter from his son **Haylett, Jr.**, telling of his father's death on December 13. We wrote immediately to his wife expressing to her and to the family the sympathy of the Class as well as our own. His son **Haylett, Jr.**, has written: "Thank you so very much for your note of December 26 to my mother. She appreciated your comments most sincerely." He sent further information concerning his father. **Haylett, Sr.**, was born in Milwaukee, Wis., June 27, 1883. Prior to M.I.T. he received the B.A. degree from Whitman College in Walla Walla, Wash., in 1907, and is believed to be the first student from Washington territory to graduate from M.I.T. Later he was awarded membership in Phi Beta Kappa from the University of Washington. He began his career with Interborough Rapid Transit Company in New York. Later he was with the Virginia Pulp and Paper Company, and during World War I was with the Submarine Defense Association and Ford, Bacon and Davis in New York. After being with Westinghouse in Chicago, he became chief engineer for Arkansas Power and Light.

In 1927 he moved to Houston to do consulting work and started his own business as a manufacturers' representative of mechanical equipment. He has written a number of technical papers, was active in A.S.M.E., and was listed in *Who's Who* and the *International Blue Book*. He was a member of a number of Masonic lodges including the Shrine, a life member of the Houston Engineering and Scientific Society, and the Texas Society of Professional Engineers from which he received the Distinguished Service Award in 1964 for 50 years of honorable service to his fellow men for his work as a professional engineer. His survivors are his wife, **Ethyl**; sons **Haylett, Jr.**, and **Ewart**; five grandchildren; and his sister, **Miss Marion O'Neill** of San Francisco. Mrs. O'Neill wrote in an earlier letter: "He thoroughly enjoyed the get-togethers with the M.I.T. Alumni in the Houston area and we always enjoyed our reunions with the class and appreciated the many kindnesses extended to us while there." —**Chester L. Dawes**, Secretary, Pierce Hall, Harvard University, Cambridge, Mass. 02138; **George E. Wallis**, Assistant Secretary, 185 Main Street, Wenham, Mass.

10

I have reached the end of the returns from my request for news from 1910 Classmates. I believe I have received about 80 replies in answer to the 167 cards sent out. . . . **Achilles Hadji-savva** sent Christmas greetings from

Greece. . . . **George W. Craigie** writes from Orlando, Fla.: "My wife and I are enjoying our retirement here. Sometimes it gets pretty warm. Our best to all class '10 members." . . . **Spencer Lane** writes from Texas: "Only news is that I am retired and I mean it this time. No M.I.T. men in this Rio Grande Valley." . . . **Frank A. Baker**, from Baltimore, writes: "Not a thing to tell of interest—just one day after another. Hope to be in Boston for a short visit and will visit Boylston Street, excuse, across the Charles." . . . **Atwood C. Page**, from Connecticut, writes: "Mrs. Page died last November. My oldest son and his wife moved into my house so I am not alone. There have been some financial problems which have taken considerable time to resolve. When I relax I go fishing." . . . Mrs. **Edwin O. Scriven** from New Jersey writes: "Edwin had a massive stroke resulting in serious brain damage during October 1966. He is immobile. He is able to get into a wheelchair which helps immeasurably—getting outdoors helps much. Moments of clarity find him understandably depressed. He had several hobbies, silk screen work, making our Christmas cards, especially fine needlepoint work and, of course, his deep interest in M.I.T. always. I regret this sad reply is necessary to your kind inquiry."

Henry C. Perley writes: "If I just signed my name as you suggested it would just indicate that I am still alive. However, I always look for class news in the *Review*, so I will add a few comments about myself. I retired in 1963 after being with the Davis and Furber Machine Company, textile machinery manufacturers, 37 years. Since then I have spent my time around my home and generally can find enough projects to keep me occupied as I have a good vegetable garden and there is always something around a house that needs attention." . . . **Philip Devlin** writes from Palatka, Fla.: "Have been in public practice (public accountant) here since 1950 and hope to continue in spite of my 79th year." . . . **John A. Holbrook** writes: "I only wish I had an interesting or exciting bit of news for the *Review*, but being retired I am living rather quietly on the shore of the Sound (Long Island). It is a very pleasant location, especially in summer. Hope to branch out again some day. Very best wishes to you and all of 1910." . . . **R. C. Jacobs, Jr.**, of La Mesa, Calif., writes that he is "one of the survivors." . . . **Hal Manson** writes: "A cataract operation on my eyes in April has restored my vision so that I can see well again with the help of new glasses. I can recommend anybody having this trouble to consider it." . . . **Frances H. Flaherty**, Brattleboro, Vt., writes: "Still organizing film study and screening the Flaherty films."

Kenneth P. Armstrong writes: "The dearth of 1910 news is no doubt due to the fact that we are all old men now. I feel like one, anyway. Most of us have re-

tired; some, like me, have re-retired; and many of us are just plain tired. After my return from our 55th Reunion I wrote you about how old age had crept up on me and gave me unstable equilibrium. That was in the February, 1966, *Review*. Since then you have published about the plaque awarded to me by the City of Opa-locka at the termination of my service on the Planning Council. (That is what I meant by re-retired.) I have also ceased activity in others things, like the DeMolay. I belong to a lot of organizations in which I used to be active, but am no more. So I must be really old. I still live all alone in this little house and rarely go anywhere except to eat in nearby restaurants. I have all the facilities for cooking and do cook my own breakfasts, but it is just too much trouble to do more since I am a lousy cook anyway. My wife passed away 14 years ago, just as we had retired to Florida. She used to do all the cooking and I never learned how. I hope to be able to continue living in this house. It is ideal for my purposes. One of my grandsons takes care of my yard and his wife cleans the house. Right now they are visiting the wife's parents in Minnesota. Drove up there with their two young children, but my house will last until they return. I depend upon them for a lot of little jobs which I would ordinarily do myself, if I had to. I now have one son, two grandsons, two granddaughters, one great-grandson and four great-granddaughters living in the Miami area. Also a younger son, two granddaughters and a grandson living in the suburbs of Washington, D. C. If I live long enough that number will doubtless increase. Florida is a very good place for elderly people. The climate in South Florida is ideal. It is moderated by the Gulf Stream just off-shore. It never gets very hot or real cold. Once in a while we have a hurricane, but we have plenty of warning and button up for it. My best regards to the remaining 'mittens'.—**Herbert S. Cleverdon**, 120 Tremont Street, Boston, Mass. 02108

11

From a letter from **James Campbell** received last December: "My partners and I put out our shingle as Eadie, Freund and Campbell on October 1, 1914. Mortimer Freund, Columbia, '06, died in 1956, but Eadie and I are still keeping busy at our general practice of mechanical, electrical and sanitary engineering. As yet we have not gotten around to discussing any plans for retirement." He sent along a copy of the New York Association of Consulting Engineers "Compendium" which contained the following: "James K. Campbell was the ninth President of our Association (1940-1941). He has been a partner of the Consulting Engineering firm of Eadie, Freund and Campbell since its establishment over 50 years ago. Following his graduation from Woodberry Forest School in Virginia he attended the

Massachusetts Institute of Technology where he received a Bachelor of Science Degree in Civil engineering. After graduation he worked as an engineer on the valuation of the New York Central lines and later on the Lehigh Valley Railroad. His next valuation job offer was turned down, however, in favor of an industrial engineering job with a New England shoe manufacturer. After this experience he joined the consulting engineering firm of Percival Robert Moses where he met John G. Eadie and Mortimer Freund. The partnership of Eadie, Freund and Campbell was formed in 1914. Jim's clients include Metropolitan Life Insurance Company, the Westchester Country Department of Public Works, and the Liquid Carbonics Division of General Dynamic Corporation. They also designed a laboratory to work out the beneficiation process for low grade uranium ore. This was done for the Atomic Energy Commission. One of the present projects that Jim Campbell is actively engaged in is the mechanical modernization of the building in which his offices are located—257 Park Avenue, South. Watch-making is Jim Campbell's hobby. He has repaired antique watches and clocks. One of the most interesting is hanging in his office. He calls it a figure-eight clock. This unusual mechanical device was fitted with a special cam by Jim when he acquired it. It permitted the clock to tell the day and the month as well as the time. James K. Campbell is a fellow and life member of the American Society of Civil Engineers, a member of the American Society of Mechanical Engineers, a member of the American Institute of Consulting Engineers, an associate member of the International Association of Electrical Inspectors, and is a member of the New York State and National Societies of Professional Engineers and a Senior Member of the Institute of Electrical and Electronic Engineers."

From Professor **Harold E. Babbitt** comes the following: "no hits, no runs and unreported errors in 1967. Completed my association with the University of Delaware, and enjoyed a 90-day cruise to South Pacific on M. V. *Sagafjord*." . . . From **Frank G. Smith** of Honolulu: "Have great grandson about one year old. His dad, George Caramea, graduate of U. S. A. F. Academy, is flying a fighter plane in Vietnam. Hopes to be in R. and D. next month." . . . A unique "Moving Day" card from **W. J. Seligman** announced his new address as Beacon Towers, 301 Golden Isle Drive, Hallandale, Fla. 33009. . . . In the February issue of *Technology Review*, under Correspondence Review, there are some comments by **Edgar Woodward**. . . . At Christmas time I had a long letter from **Paul Cushman**, whose wife Otillie died last September. In January of last year the Cushmans made a trip to Mexico City and really went in for sightseeing. Later by bus they visited Alabaster Caverns near Free-

dom, Okla. Then in July, with their square dance group, they went by train to Chicago and Washington, then by bus to Philadelphia, New York, Montreal, Quebec, Toronto and Detroit, with sightseeing and dancing at every stop. Just before her death Otillie attended the 55-year Reunion of her class in Michigan. Paul still belongs to eight square dance clubs, plays bridge and attends his lodge a couple of times a week. He has 22 years perfect attendance in Kiwanis, and is on call as chief engineer of the L. and S. Bearing Company. He is Professor Emeritus of Aerospace and Mechanical Engineering at the University of Oklahoma. Though he has family ties in New England, he likes the climate in Oklahoma and plans to remain there. He remembers playing with **Jim Duffy** in Dorchester in 1903, and going to camp in Maine with **Roy MacPherson** in 1905.—**Oberlin S. Clark**, Secretary, 50 Leonard Road, North Weymouth, Mass. 02191

12

Do you remember Charlie Cross' physics lectures and his well-known illustrations of static electricity? First a catskin was produced which he stroked with an ebonite rod, evoking a bedlam of cat calls from the students. Then a piece of silk—"And fortunately, gentlemen, the silk worm emits no distinctive sound!"

Harold Manning writes as follows: "In 1964, I retired from my lifelong practice of Patent and Trademark Law in Waterbury, Conn., and turned it over to a firm of Hartford patent lawyers. We sold our home in Waterbury and are now living in a garden apartment of 40 units with swimming pool in the nearby town of Woodbury. We have always liked this town, and are thoroughly enjoying life in this congenial suburban community where we have many friends. We have retained our church connections in Waterbury where we are quite active. Both Helen and I are in reasonably good health and enjoy travelling whenever possible. We have been to England twice, last year going on the *Queen Elizabeth* which was a very pleasant part of the trip. A year ago we went to Bermuda, staying in the Somerset area and seeing parts of the island we had missed before. In common with **Ray Wilson** and Helen, we are interested in covered bridges and have photographed several hundred to date. In so doing we have travelled through many country sections of the Eastern states, which otherwise we would never have seen. I attend Rotary Club in Waterbury each week and bowl with the Rotary-Kiwanis League. I also continue to play some golf. We regularly attend the Bushnell Memorial Hall lectures and travelogues in Hartford which provide the best in photography and speakers. Woodbury has a growing Nature Center with Audubon lectures on wildlife presented by the best speakers and in the summer we are always ready for the Boston Symphony concerts in Tangle-

wood. We are members of the local Historical Society, which has recently acquired a 1680 house for restoration. There are many other fine old houses in town. Helen and I both feel that our last Reunion was one of the best and you may register our vote to hold another in two or three years.

An interesting letter from **Paul Lawrence** was forwarded by Jay. "I started work in 1912 with the Research Laboratories of the American Sheet and Tin Plate Company, a division of the U.S. Steel Company in Pittsburgh, Pa., under Bradley Dewey, M.I.T. 1909. Next year I became metallurgist at the new Gary Sheet Mill and later was made assistant manager. Cold reduction was then replacing rolling along other advances, such as continuous annealing and electrolytic plating. In 1926, I went to their Chicago office as special representative of the Sheet and Tin Plate Division and visited customers and branch office salesmen to keep them informed of the advances in these products. This involved much travel about the country, south and west including Canada, with very few nights at home. I had become well acquainted with both the American and Continental Can Companies and when the sheet and tin plants merged with U.S. Steel in 1939, I was appointed Assistant to General Superintendent in Gary, Ind., a position I held till retirement in 1952. In 1914 I married Edna Draper of Sidney, Iowa, Wellesley 1912, whom I met while at Tech. Our older son, Paul, Jr., graduated from Williams (also my alma mater), and from University of Chicago. He is now in real estate in Berkeley, Calif. Our younger son, George, is also a graduate of Williams and M.I.T., and is with the American Bridge Company (U.S. Steel) as engineer for Electric Furnaces. Edna and I have done considerable travelling about this country since my retirement, including visits to Mexico, Hawaii and Alaska. Golf was my favorite hobby, although Edna was the better player. I have also been active in some church work. So far I have not attended a Reunion but hope to do so. It was nice to hear from you.

From **Bob Wiseman** comes this interesting letter. "Your letter and the class notes in the December issue of the *Review* made me decide to write at once. The notes show we still have an active membership, both in business and after retirement. I intended to be at the Reunion last June but ended up in the hospital for an operation from which I now have recovered. I was married in 1930 and after 15 happy years my wife passed away in 1945. We had no children. After graduation I returned to Tech for one year as assistant to Dr. Laws, following which I spent two years in graduate study, receiving the degree of Doctor of Engineering. After two more years of research at Tech I spent three years with the Western Union Telegraph Company and the National Conduit and Cable Company on research work. In 1921 I became

Research Engineer with the Okonite Company with whom I remained 38 years, retiring in 1959 as Vice President. However, I still continued with Okonite as a cable consultant until last July. My association with Okonite has been most enjoyable. I had a part in the research and development of natural and synthetic rubber, thermoplastic cable and impregnated insulated cable and helped in the design and building of their paper cable plant, and later developed procedures for the manufacture of high voltage cables up to 345 kv. operation. This was a fascinating project, requiring a study of the electrical, thermal and physical characteristics of copper conductor and insulation. Field tests made at Cornell under our supervision resulted in valuable and encouraging information on cable characteristics which has resulted in the consideration of the use of 500 kv. cables. A similar field study is planned for the Edison Electric Institute which will take 10 years and cost \$10 million or more, assuming it includes cables up to 750 kv. a-c and 600 kv. d-c as proposed. Four cable manufacturers are now making preliminary studies and I hope to continue on a consulting basis. In 1959 Okonite built a completely new plant for extra high voltage cables and the plant was dedicated the Dr. Robert J. Wiseman Building as a tribute to my part in this development. My work at Okonite resulted in membership in many engineering and technical organizations both in the United States and Europe, where I have been many times on engineering work for Okonite. I was both Secretary and President, over a six year period, of the Insulated Power Cable Engineers Association and served on the International Electrotechnical Commission as well as several committees of the American Institute of Electrical Engineers. They have just awarded me the William M. Habirshaw medal for advancement of electric power cables, particularly in the high voltage range." Seems to me, Bob, you are still a long way from retirement. You're going strong and we are proud of your achievements.

I was most pleased to hear from **Paul Tyler** who has spent a very interesting life in Washington. His career, until his retirement, was summarized for 30 odd years in *Who's Who*, but he modestly states that he has not felt that his activities were too interesting. He writes: "After graduation I worked for several years as mine and smelter laborer, engineer and research worker in Canada, Mexico and the United States. I located in Washington in 1918 where most of my activities since have been with the government, first with the Tariff Commission and then for many years with the Bureau of Mines with whom I was actively employed until 1945. At that time I was Regional Director of all activities, including research, exploration and economics, in the 21 states of the Eastern Division. I have occasionally accepted assignments for short periods on matters dealing with minerals for

many other governments, as well as for some state agencies. This has resulted in the publication of several hundred articles and papers by the Government, encyclopedias and trade journals. The most colorful of several assignments in Europe, covering some 25 countries, was the reporting of activities in minerals to the Congressional "Watchdog" Committee on the Marshall Plan. I recall one highlight in 1949 when I spent a night in the Sultan's harem in Marrakech, French Morocco. All the ladies had departed, however, some months before arrival. In 1953 I spent five months in Spain establishing a private tungsten ore treatment plant. The next year I went to Alaska for an international committee to study the value of a proposed hydroelectric installation which would take water from the Yukon through tunnels to sea level at Skagway. Our amphibious plane served not only for longer hops but also as a motor boat on the lakes or for travel on the Alcan Highway. I officially retired from the government in 1951 but continued as a consultant for various agencies and for the National Academy of Sciences and others until 1965. I have long been a member of the American Institute of Mining, Metallurgical and Petroleum Engineers and helped to organize the Industrial Minerals Division. In 1966, I was awarded their A.I.M.E. Medal of Honor. I also received a Certificate of Appreciation from the War Department for work in Germany after the war under the Joint Chiefs of Staff to secure information on the mineral industries. In 1920 I married the girl I took to the junior and senior proms and were very happy together until her passing in 1961. I later married a close mutual friend. The past five years we have travelled a great deal driving about England with some short trips to the Continent. In 1964, we took a world cruise in the *Caronia* and enjoyed this type of travel so much we have since cruised the Mediterranean and again took the *Caronia* to Scandinavia. This winter we are planning a cruise to South America. We find that some people take repeat cruises on luxury liners like the *Caronia* just to enjoy the security and luxury of British service. We sensed this on return to the ship in India after a week's tour to find an illuminated sign at shipside, 'Welcome Home,' and when the steward greeted us and had our luggage in place, it seemed that we really had returned home. My recent contacts with Tech have been limited since those friends I knew best at the Institute have long been gone. In 1946 I returned for a year on an Atomic Energy Commission research project, working with Professor Tony Gaudin at Watertown Arsenal, and maintained contact with Cambridge but have not been back since that time. My best wishes to all the Class!"

A letter from **Bill Bird**, whose address is now Box L, 200 North Ocean Boulevard, Delray Beach, Fla. 33444, reads: "I retired as President of Pro-phy-lactic Brush Company, Florence, Mass.,

in 1962. I am now making my permanent home in Florida, avoiding outside activities as much as possible and have given up all directorships, civic work and such. I am still playing a little golf (18 holes), and taking it easy in general. My wife lives here with me. I have a daughter and three grandchildren who live in Longmeadow, Mass. I am most glad to rest after a very active business life of 50 years, and travel abroad many times during this period. I am now prepared to look back upon it all and say, 'I've had it!' . . . My first unsolicited letter has arrived from **John Hall** of Allenhurst, N. J. He says, "The changed appearance of *Technology Review* and the more and better news from our classmates inspire me to take pen in hand with the hope that it may cause others to do so. It is good to find that our vital statistics are improving, judging from the fact that the last two issues seem to have less obituary notices than usual. This burst of enthusiasm is probably also due to seeing two of my old friends as leading contributors to the December issue, **Harry Babcock** and **Jesse Hakes**. They bring back entertaining episodes which I still vividly recall. My own record can be boiled down into small space. I rank high as a 'rolling stone' but low as a real credit to my Alma Mater. Henry was an unwitting promoter of the facts of political life in those days. Several of us were running for the five places on the Prom Committee. I decided it was unethical to vote for myself and voted for Henry instead. The results of the poll showed he had won fifth place on the Committee by one more vote than I received! Jesse Hakes and I sat next to each other in Structures, and as we looked a little alike Professor Spofford was never sure which was which. So, when he pointed an uncertain finger in our direction, Jesse usually gave the answer and I kept quiet. I suppose the law of averages would give me 50 per cent of the credit. In any event, I passed which was all right by me. I always liked Jesse and we saw each other often when we were later in Baltimore. He was with the B. and O., and I with the State Department of Health. We must have something basically in common for he is now raising flowers. So am I, but only as an avocation. I also like to make hex signs such as are frequently found in Pennsylvania on barns and other buildings. Many of the joys of getting older are the memories we cherish of the cheerful little things rather than the momentous ones. I can recall more detail of the incidental courses than the ones that got us our degrees. Precision of measurements is still important to me as a guide for relative values and other similar matters. I shall enjoy tying knots. Just the other day I needed to tie a rope to a ring and, believe it or not, I produced a very professional bowline on bight which should hold longer than I will. Before mailing some old math books to a friend in Ethiopia I looked them over and wondered what all that silly looking stuff could be. But to have all that

safely put away, gone and almost forgotten, keeps me well and cheerful. Now that the rust is off my seldom used pen and some of the cobwebs are blown out of my brain, I could keep on indefinitely. But I won't."

Jesse Hakes and Mary left last January for a three months cruise to Africa and around South America on the *MS Sagafjord*. Bon Voyage to you both! We hope to get an account of this interesting trip on your return. . . . **Harold Mitchell**, our bird fancier, advises that he has given up his position as President of the Buffalo Society of Natural Sciences, his last official act being to arrange for the purchase of a 125 acre tract for a wildlife refuge with a large pond for the Museum. He continues to be most active in this hobby, however, and attended the annual meeting of the National Audubon Society in Atlantic City last fall, where he also had an opportunity to do a bit of bird watching. He also took a trip to the unique Hawk Mountain Sanctuary in Pennsylvania. In March he and Mildred plan a four month trip to the cactus country from Texas to California when the birds are migrating from Mexico, following which they will visit Seattle where his grandson is graduating from college. They will then fly to Fairbanks, Alaska, to attend an A.O.U. meeting in June. Here they hope to visit the arctic tundra and see nesting wildfowl and shore birds. A most interesting and active hobby, Harold. More power to you. . . . Helen and I are presently recovering from a three week visit with our daughter and family in Pasadena Heights, St. Louis, Mo., where we had an intensive education in the life of the modern teenager as exemplified by our four granddaughters aged 17 to 8. Although we enjoyed our holiday visit with them immensely, we had not previously realized that we really are getting older. On Christmas day we had a pleasant phone call from **Jay Pratt** and Priscilla, who were also visiting with their son and family in St. Louis. It is snowing here today but as soon as the roads are clear we plan to depart for warm weather and sunshine in Florida. However, the postman has agreed to forward all letters so don't forget we shall be waiting to hear from you.—**Ray E. Wilson**, Secretary, 304 Park Avenue, Swarthmore, Pa. 19081; **Jay H. Pratt**, 937 Fair Oaks Avenue, Oak Park, Ill. 60302

13

55th Reunion; Coonamessett Inn, Falmouth; June 7-10, 1968; for reservations: George P. Capen, 60 Everett Street, Canton, Mass.

"The Ides of March" is here. This is the year of our 55th Reunion. Will you and your family be with us at that occasion on the Cape, enjoying the splendor of good fellowship in the Dutch Village, Coonamessett Inn, Jones and Gifford Street, Falmouth, Mass.? . . . Our classmate **C. Lalor Burdick** is still a very

active member of the Lalor Foundation in which he is the Secretary and Director in reproductive physiology and allied fields. This Lalor Foundation gave research grants and awards totaling \$1,432,000 to 552 appointees in 1967. Congratulations for your earnest endeavors. . . . Yes, again we must mention the marriage of Janet Mattson to Frank William Pillman on October 9, 1967. Our best wishes to you, Janet, and to the lucky man, Frank Pillman. . . . It is noted that two of our Classmates have commented on the new *Review*. **Howard Currier's** and **Bill Brewster's** opinions are refreshing. . . . We have received a few comments from two of our buddies. **Allen Brewer** states: "See 'Senior Portfolia' Class of 1913." What's the answer? **George Dempsey** pens: "Retired shoe manufacturer (1965) and now a sales consultant for shoe manufacturers." . . . It is with a heavy heart that we receive notification in various ways of our departed men and women. A brief notation has been received as the result of sending out the yearly dues bills. **Robert A. Nowlin** died on December 5, 1965.

Edward A. Hubbard's envelope was returned marked deceased. . . . From the Alumni Office comes the brief notice that **Henry W. Dew**, 3703 Ortega Boulevard, Jacksonville, Fla. 32201, died June 17, 1967. Can any classmate furnish more detailed information regarding the activities of these departed friends? . . . We were saddened to receive news of our beloved pal **Lammy Lemaire** relayed from his son J. E. Lemaire via Fred Lehmann. Lammy passed on, due to a heart attack, on Sunday, November 12, 1967. He was a wonderful man. A general of the English Army in both World Wars I and II he was given up on at least two occasions as dead, but he survived. He was outstanding in the festivities at our 50th Reunion, and subsequently made a world tour, lecturing in this country, England, and several of the Mediterranean countries in the interest of his home land, Australia. In fact, his son states that he was preparing for another world tour, and we suspect that our 55th Reunion was on his itinerary. We shall miss Lammy's humorous epistles. . . . Through G. Y. Anderson, M.I.T., '24, we learned of the passing of another loyal thirteener, **Mortimer P. Allen**, who died on December 7, 1967, following a heart attack. Mort graduated with a degree in civil engineering in 1913 and received a masters degree in 1914. He spent many years in the construction machinery business as an engineer, but eventually returned to his first employer, the Milwaukee Equipment Company. At the time of his death he was Treasurer of the Milwaukee Equipment Company. He was a member of the Walrus Club, the English Speaking Union, the Friends of Art and active in the M.I.T. Club of Milwaukee as well as having been a past president of the Milwaukee Lawn Bowling Club. Allen is survived by his charming wife, Hazel, and two daughters, Mrs. Albert (Priscilla) Powersetauket, New York, and Mrs. William (Nina)

Johnson, Winnetka, Ill. To Mort's family the members of the Class of 1913 offer our sincere sympathy in these hours of grief.

Again we must bring sad tidings, Gene Bonney, Bob's dear wife, passed away on December 15, 1967. The Capen family will never forget our pleasant and happy visits with Bob and Gene. . . . We were very pleased to receive so many gracious cards from our many M.I.T. friends, including: the **Allen Brewers**, the **Ellis Brewsters**, **Charles Thompson**, Marguerite and **Prescott Kelly**, the **George Bakemans**, Jo and **Bill Mattson**, Ethel Gustin, Katherine and Irving McDaniel, '16, Janet (Mattson) and William Pillman, and the staff of the *Technology Review*. . . . **William New-some Eichorn** suggests we send out a notice to our classmates in May reminding them of the 55th Reunion. . . . **Burt Cushing** writes: "I am very sorry to report that my dear wife, Florence, passed away last January 11." We shall miss Florence at our 55th. We extend to you, Burt, the wholehearted sympathy of all the thirteens. . . . Bill Brewster pens: "I think Coonamessett is fine. Regards to you both." . . . We have comments regarding attendance at the 55th Reunion. **Jack Horsch** states: "Too early to make a prediction. Best regards and congratulations on the good job you are doing and on being able to do it." . . . **H. J. Shaw** makes reservations for two. We shall gladly honor your request, Herb. . . . It was very fine to hear from **Ed Hurst** and after this extremely snowy and frigid winter is over the Capens are looking forward to a pleasant visit with him in Duxbury. . . . **George Richter** states: "Maybe we can make it." . . . **Prescott Kelly** writes "Only if someone can pick us up at Boston Airport and return us to it." Prescott, we guarantee to transport you and Margurite from the Airport to Falmouth and return.

We were terribly shocked to hear from **Allen Brewer** that his oldest son, Allen, Jr., lost his life in a small plane crash in Pennsylvania on September 21. He was 46. We extend our sympathy, and look forward to seeing the Brewers in June. . . . We enjoyed the note from **Charlotte Sage Simonds** which she found time for in spite of her very busy routine. She has stated that she will join us June 8 to 10 at Falmouth. Also, she will be very glad to furnish transportation for any classmate to the Cape. . . . **Harold Crawford** writes: "Not in good health now. Just getting out of the old rocking chair, following a slight coronary." Hope you have your good health again, Harold, and expect you will be with us in June. . . . It was very interesting to hear that **Henie Glidden** and his nice wife travelled to the West Coast, spending a week with **Fred Kennedy** and driving along the California Coast with side trips to the Grand Canyon, Yosemite and other places of interest. The Gliddens will join us at the 55th the Henie will show colored slides for the benefit of us stay-at-homes. . . . Your Scribe and partner are very busy, and except

for failing sight (GPC) and the various old age ailments, are still active. We are looking forward to seeing our friends, classmates and their wives. Three months from the time you read these notes, we shall invade Falmouth on the Cape and be staying in the Dutch Village of Coonamessett Inn.—**George Philip Capen**, Secretary and Treasurer, 60 Everett Street, Canton, Mass. 02021

14

Now it can be told—a bit of sports news from the Charles River Bank. "A new varsity shell was dedicated in the name of **Leicester F. Hamilton** at a ceremony attended by 40 of his friends at the Pierce Boathouse in mid-November. L. F. H. has been Faculty Advisor for about 30 years." Note: "Each sport has a faculty advisor—a go-between to faculty from coaches—who attends sports events—times and judges races—attends monthly meetings of coaches and all advisors—and in the case of the crew—rides the launch carrying the referee and generally take all kinds of weather (cold and rainy)." . . . We have news of the death of **Ralph C. Goeth**, Course IV, at his home in Austin, Texas. Over the years since shortly after graduation Ralph had been associated with Tips Industries in Austin, including the Walter Tips Company of which he was president and general manager at one time. Their business affiliations included the Walter Tips Engine Works and later the Tips Iron and Steel Company. The sympathies of the Class are extended to Mrs. Goeth and her son. . . . We also have a notice passed on to us by the Alumni Office of the death of **Merton B. Lewis** of Westerly, R.I., in 1963. He was apparently a member of our class for a short time in Course VI but our records have no real information. It is possible that some of you who read this may recall him. . . . Here are a few up-to-date addresses: **Arthur F. Petts**, 40 Albert Street, Melrose, Mass. 02176; **Frederick F. Mackentepe**, 850 Lake Shore Drive, Chicago, Ill. 60611; **Long Lau**, 654 A North Kuakini Street, Honolulu, Hawaii 96817; **Raymond D. MacCart**, Harbor House, 506 Pompano Beach, Fla. 33062.

Here's a news clipping from the *Mines Magazine* in Denver: "**Charles F. Thompson**, 78, is retiring after 46 years with Mine and Smelter Supply Company, Denver. Thompson was born in Boston, attended Dartmouth and Massachusetts Institute of Technology and played football for both schools. Following graduation from M.I.T. he worked as a metallurgical engineer and mill superintendent for the Phelps Dodge Corporation at Tyrone, N.M. This was at the time when the copper mining companies were beginning to develop large tonnage operations. He was in charge of the company's test work on Marcy grinding mills, manufactured by Mine and Smelter, which were being considered for installation at the Phelps Dodge mine in Mexico. Mr. Thompson joined this new

Marcy Mill Division of Mine and Smelter in 1921. He has been closely identified with the development and refinement of ore grinding practice through test and field work in cooperation with the leading mining companies in the U.S., Mexico and Canada. He has been an active member of the American Institute of Mining and Metallurgical Engineers, and the Colorado and New Mexico Mining Associations." . . . We had a note from **Bob Townend** at Christmas. It mentions a few of the things that he and Maude have been doing, communally-wise, in his New Jersey area, and then pledges us modestly not to expose them which we will respect but with regret. Bob still interviews applicants for admission to M.I.T. for the Educational Council, which I may add we have continued to do in the Central Maine area.—**Herman A. Affel**, Secretary, Rome, Maine. P.O. RFD 2, Oakland, Maine 04963

15

The 55 cards we received from widely scattered Classmates and their families were a warm reminder that the joy of Christmas is a good deal in living with the memory of fine, old friendships. The **Ellis Brewsters** (1913) had an original card simply listing, with their silhouettes, their social security, Medicare, Zip Code and phone numbers. **Betty and Glen Jackson** (1927) had a big folded map showing their round-the-world return from Teheran, Iran, to reach home in Amherst, N.H., in time for the Holidays. **Frank Stubbings**, 1927, is reaching the retirement age and he and **Edna** are considering moving from Louiseville, Quebec to a warmer climate. **Fan and Herb Gefroerrer** (1918) have had a hard year with Jeff's serious illness. Mrs. **Ralph Jope's** Christmas Poem described her visits with her children. **Vi and Dix Proctor** (1917) had left before the holidays for a four months round-the-world trip in a freighter—brave people! **Phil Alger's** annual poem described the tough year Helen and he had had with her leg fracture and his surgery. . . . **Doug Baker**:—"Elizabeth is busier than ever, since during part of the summer she did a lot of chauffeuring for me. I am feeling better than for several years, after a series of cobalt radiation treatments from August to October, which were interesting technically and proved successful. We are great grand-parents, thanks to a granddaughter married to a local boy. It is good to have one branch of our family near enough so we can see them often. . . . Helen and **Ken Boynton** sent an unusual colored print of "Biltmore House"—a tourist attraction near them. It was built in 1900, along the lines of a French chateau by the late Commodore Vanderbilt.

Buelah and Earle Brown are looking forward to our 55th Reunion. . . . **Marj and Whit Brown**, in Brandenton, wrote they plan to attend an M.I.T. meeting in Orlando in January. But Whit does not

think it will equal our Class dinners in Boston and New York. Loyal old Whit. . . . **Fran and Henry Daley** are in better health and Henry is looking forward to the New York Class dinner on April 26. . . . When you think of these plans of **Helen and Otto Hilbert**, you have to marvel at their energy and stamina for such a long, involved trip. Otto wrote: "We had a nice year. We spent about a month in California, then we visited relatives in East Germany, then some friends in West Germany. From the Rotary Convention in Nice we went to Copenhagen, which we enjoyed. While visiting friends in Helsinki we saw some of the lakes of Finland, very pretty country. On to Oslo and Bergen, when we took a two week cruise to the North Cape with much to see and enjoy. Back to Copenhagen to return to New York on the *Bergensfjord*. About February first we plan to sail to spend a week or so in Southern Spain and North Africa. Then to Cape Town and Johannesburg to see some more wild animals in a private game preserve. After 10 days in Portugal, we'll visit our granddaughter who is in her third year in college in West Germany. We have applied for a visa to revisit East Germany. We'll get home from Cannes in time to go to the Rotary Convention in Mexico City in May." How's that for a tour? . . . **Ken Johnson**: "This year has been one of assorted blessings. On December 1, 1967, I passed a record for me—I did not wind up in a hospital. It's been two years since my last trip. However, Ester, sort of upset our record by being in during November."

Ben Lapp, retired, returned to an office job at his former plant in Buffalo and liked it very much. . . . Virginia and **Hank Marion** will be at Desert Club Apartments, 3805 East 5th Street, Tucson, Ariz., all winter and would like to see any Classmates passing thru out there. . . . **Ben Neal**'s card was the cutest and most unusual—simply a colored print of a picture he took of Fran and me last August, sitting in the sun on the porch of his Cushing Island, Maine house. . . . Again, **Al Sampson** sent a beautiful silk screen print made in Milano. . . . A long note from **Ray Stringfield**: "Things here still percolate along and keep my molecules vibrating. Guess I'm not as smart as some of my classmates but it's still lots of fun. **Dave Hughes** and **Walt Rivers** are still full of pep. Dave chases back and forth between here and his cattle ranches in Kansas, and spends a lot of time here in his garden. Walt keeps his wife and friends happy by playing the piano and beating them at shuffle board. **John Gallagher** and **Fran Boynton** aren't too active, and we have a hard time getting them out to any M.I.T. function. Fran's eyes bother him, and probably John is disappointed that Texaco didn't fold up when he retired. My activities are more nasty. Nicked a firm \$100,000 three weeks ago for doing a bum re-treading job on a perfectly good tire which resulted in an accident with serious injuries to a young boy. Best

regards, and do come out this way again."

Ah, that **Jim Tobey** again:—"Come on down. Here at West Palm, temperatures 82°, water 77°—you poor Eskimos." . . . **Eastie Weaver**'s son, Jim (1944), writes that Eastie is in a convalescent hospital in Berkeley, Calif., and seems to be somewhat improved, but it is slow going for him. How about cheering him with a note or card to his daughter's—Mrs. Ann Caulfield, 1527 Lincoln Street, Berkeley, Calif. 94703. . . . **Louie Zepfler** invites us to come out to his Tucson, Ariz., apartments and enjoy their sun. He writes "It's later than you think." Does he have to remind us? . . . In addition to cards from so many Classmates, we received many from 1915 families, widows and children:—Alice Anderson, Cynthia Blodgett, Marion Howlett, Ruth Hayward, Ruthie (Place) Hickey, Margeret Runels, May Sheils, Bill Sheils and his sister, Mollie Swift, Mary Scully and Darthea (MacBride) Wagner. And a cute picture of Peter Murphy's six children, grandchildren of Lucy and **Harry Murphy**.

Long distance cards came from **Ernie Loveland** in Manila, Philippines and Carmela and Gus Gross (1950) in Guayaquil, Ecuador. Long may the flames of these fine old Class friendships brilliantly burn to light our lives in the future.

Harold Dodge, 1916 Secretary, and I continue our interesting correspondence, particularly in recording the comments from Classmates about the new format of the *Review*. Stan Dunning sent me the eight page "Reunion News" of the 1917 50th Reunion last June at Chatham Bars Inn, Cape Cod. It's an excellent job, replete with many pictures and glowing accounts of their big Reunion. Many thanks. . . . The Annual New York Class Dinner will be held at The Chemists' Club on April 26, and the Boston Meeting will be held at the M.I.T. Faculty Club on May 3. Detailed notices will be sent by **Larry Landers**. . . . **Wayne Bradley** wrote that **Johnnie Kelleher**, V, died December 7, in Canton, Mass. Johnnie had dropped out of all our activities and had carried in the records, for a long time, as "Deceased—date unknown." Many will remember that undergraduate trio of Johnnie, Frank Wall and Wayne. . . . This month's notes came mostly from your lovely and thoughtful Christmas cards—but how about next month? Help Aze!—**Azel W. Mack**, Secretary, 100 Memorial Drive, Cambridge, Mass. 02142

16

From somewhere up in the snow country we have this opening message from our ski-loving President **Ralph Fletcher**: "It is that time of year when we should again 'put our house in order' so that nothing will interfere with our being present at our annual Class reunion. The same wonderful accommodations are being prepared for our return to

the Chatham Bars Inn on June 7, 8 and 9, and we are counting on the weatherman to favor us with the usual fine weather. Some of our dearest friends and classmates will not be present this year because their attendance was required at the 'eternal' reunion, but the joys (no sorrows) of our memories of them will be with us always and particularly when we gather together for our reunions. These may not be the 'best years of our lives' but our reunions are among our best activities of these years. Make plans now to be with us at Chatham." . . . We are very sorry indeed to report the death of one of our active reliables, a member of our Class Advisory Council, **Leonard E. Best** on December 13 after a long illness. Several Sixteeners attended his funeral in Calvary Episcopal Church in Summit, N. J. Len's first job was with Hood Rubber at Watertown. He later went with U.S. Rubber but in 1935 he joined the family firm, Richard E. Best Pencil Company which his father and an uncle had founded in 1891. He went back to U.S. Rubber in 1940 on war work but returned to his company as assistant treasurer and later became president. The *Summit Herald* of December 21 speaks of him as "one of New Jersey's most active and most outstanding civilian lobbyists for better education." Its editorial says: "After serving for many years on the local Board of Education Mr. Best found his educational appetite so whetted that he went on to serve at the state level and ultimately was responsible for much of the legislation which enabled the state to expand its educational facilities, particularly at the college level. During the years that he worked, without any thought of recompense, for the good of education in the state, he traveled widely to tell his story and the story of a state which suffered from a severe lack of university and college facilities. . . . At the same time, on home ground, he was extremely active in his church and practiced his religious beliefs in a concrete fashion. It is difficult to express what Summit and New Jersey owe to Mr. Best. But, there is no question that we are all better off because he lived. He will be missed."

From the *New York Times* we have: "In 1953, he was awarded the New Jersey Education Association's annual Award for Distinguished Service to Education. He had been chairman of the State Educational Planning Commission and in 1950 was appointed chairman of the State School Aid Commission by Governor Alfred E. Driscoll. He was a former president of the Union County Board of Education and a member of the Summit board of education for 14 years." And from the *Herald*: "In 1953 he was named chairman of the New Jersey Citizens Committee for State School Aid and in 1957 chairman of the New Jersey Citizens Committee for Public Schools. He also served as chairman of the New Jersey Citizens Committee for College Opportunities which was successful in obtaining

voter approval of a \$66 million bond issue for state colleges." And in the middle of these busy 50's he was honored with one of the annual Stuart Reed awards by the Summit Y.M.C.A. for outstanding service to youth. He received many awards in the field of education, and among them was an honorary doctorate degree from Paterson State College, and a room with his portrait dedicated to him in the headquarters of the New Jersey Federation of District Boards of Education in Trenton. Just a year or two ago he headed a successful campaign for a statewide sales tax for school aid rather than a state income tax. He is survived by his wife, Mrs. Ruth Skidmore Darwent Best; a son, Richard E. Best of Berkeley Heights; four daughters: Mrs. Robert Canine and Mrs. George Cousins, both of San Jose, Calif.; Mrs. John Ross of Pittsburgh, Pa.; and Mrs. Dennis Shaw of Warren Township. He will surely be missed in the councils and the doings of the Class of 1916! And our deepest sympathy to Ruth Best whom we have come to know so well at reunions.

We have reports that **Hovey Freeman** is making progress after his hospital session and is fully enjoying their summer home on Poppasquash Road, Bristol, R. I., since putting in heat and insulation. Says they gave up their Providence house which they had occupied 48 years. Can anyone beat that? Maybe it is a Class of 1916 record. Hovey now has "six happily married children and 23 grandchildren." This we thought was a 1916 record until we received a letter from **Eric Schabacker** of Erie, Pa., who boasts "five happily married children and 25 grandchildren." We haven't checked lately so must get in touch with **Paul Duff** of Peabody to see how he is making out in this department. Eric says he now spends very little time at his Erie Ceramic Arts Company which is now being run by his son-in-law and since November, 1965, by his son who returned then as a Naval Flying Commander. Then Eric speaks of reading Van Bush's essay "The Search for Understanding" in the December *Review*, one of the 10 essays in his new book *Science Is Not Enough*. This, he says, along with Ruth Moore's "Niels Bohr" prompted him to read Van's entire book and then for the first time, Leslie Grove's book on the Manhattan Project—"good reading all but they make you realize how much you missed over the past years. We sure had some very illustrious stars in 1916." Van's book was reviewed by Charles Poore in the December 28, 1967, *New York Times*, and we can't resist including a few excerpts: "He always writes with relish. Awesome learning is displayed without the showiness of those upon whom assurance sits, as T. S. Eliot said in another connection, like a silk hat. The engaging impulse that led him to put a dazzling treatise on baseball ballistics among his volume's exalted papers gives you, I think, a cheerful measure of the man. Science,

he tells us, is not enough. Well, ladies and gentlemen, shouldn't he know? . . . Lasers, quasers and masers do their dervish dances. The computer, like the penguin in the little girl's book, tells us more than we really want to know. What shines through the vast obscurities that Mr. Bush ponders where he can't dispel is his faith in man's courage to face destiny. Our children's children, he suggests, may go astoundingly far. It's up to us, now, 'to leave them a heritage, even though we live in perilous days. Thus we would continue to delve and to ponder, even while we strive to keep the bombs from falling, even if we know that the bombs will fall and that things we love may perish. For if we fail to struggle, and fail to think beyond our petty lot, we accept a sordid role. The light in our minds tell us that there is more to life than this.' "

And speaking of Van's book *Science Is Not Enough*, we just happened to unearth in the October 1966, *Readers Digest* this somber bit by Mignon McLaughlin in the *Atlantic Monthly* "Youth is not enough. And love is not enough. And success is not enough. And, if we could achieve it, enough would not be enough." . . . Helen and **Bill Leach** have been going through all the confusion of closing down their farm in Youngstown, N.Y., and taking lots of things, two van loads, down to their home in Austin, Texas. Bill says they brought so much that they have had to build a storage house in their back yard. This is right down Bill's alley for he says: "I believe that one of the best ways to keep healthy is to keep busy." Then: "The storage shed is completed except to restore the cyclone fence so that our German shepherd, Duchess, can not get out. She is a beauty and so smart that we ought to send her to M.I.T." We can expect to see Helen and Bill at the 52d in June, trusting that there is no conflict with their trip to Chicago and the dedication of the x-ray laboratory that they have given to the University of Chicago. Bill adds: "By the way, I have been wearing my 1916 50th red blazer to some of the season's parties. It is quite a conversation piece." Actually, you know, M.I.T. is getting well-advertised in a new way with these red blazers that we used at the 50th in 1966 and that the Class of 1917 also sported just last June. For example, here's a note that we received from **Art Shuey** in mid-December: "Just came home from a long weekend with **Vertrees Young** and Sylvia in Bogalusa. Even more I regret missing your visit there. Had two marvelous parties where, of course, Vert and I were properly attired in our 1916 Christmas finery, the red blazers of the 50th."

In the January issue, we asked **Allen Pettee** of Tryon, N.C., for an example please of the Mayan numerical system, their dot dash zero vigesimal system, which he admires so much. Allen says he's working on it, maybe an example of multiplying 2 by 3, but we have

reminded him that to go in our column the example must be so clear that all the rest of us can understand it. He speaks of another triumph, stopping a bad leak (he thinks) in a 10-year-old tarpaper and gravel roof, something the roofer couldn't do. He says "he thinks" because his job has been tested by only two rainstorms and, as he remembers, a fair sample of an absolutely unknown population is something like 473. Or perhaps less, he adds, because he did use a certain amount of perspicuity in doing the patching. We'll ask for a new report after he has enlarged his sample. . . . Here's a good letter from **Clint Carpenter** in Norfolk with a sentiment that is widely echoed: "I cannot match **Irv McDaniel's** long and interesting accounting of his experiences nor **Art Shuey's** intimate letters but surely the close and sincere relationship between Sixteeners over the years is outstanding and to be cherished." . . . In February we showed a picture of Frances and **Henry Shepard** in their 1913 Chalmers Pony Tonneau, similar to the one he used as a demonstrator when he was an agent of Chalmers. It has a 30 horsepower four cylinder engine. Henry says: "On the last tour of the season, November 12, we came home from New London, N.H., a distance of 105 miles, in just under three hours, making 14.5 miles per gallon."

Word from **Stew Rowlett** in Clearwater tells about keeping busy with his roses and bushes and portrait painting. Sounds very good and quite different from recent activities up this way—fighting snow and ice and sleet and wondering whether you can get the car up the steep icy driveway. . . . And **Emory Kemp** writing from Sarasota in early December found it hard to believe that Christmas was close at hand "when you have summer temperatures practically the year around. The maximum temperature during the day since November 1 has been 86 degrees and the minimum 71. Nighttime maximum has been 68 and minimum 41 and not a drop of rain for 36 days, every one absolutely beautiful. Just now, first shower and our lawn will be pleased. Down here most all social calls are made during the daytime due I suppose to the fact that the majority of all our friends are retired and have all day free. Have not seen any of our class but at the last meeting in October of our Southwest Florida Alumni Club (Ladies Night) we had 24 alumni with their wives and, as always, enjoyed the evening immensely. We try to have a meeting every month from October to May." Emory also reports a "small world" incident; his daughter and husband had taken a 21-day cruise in the Mediterranean and found on the same U.S. *Constitution* cruise, Ben Groenewold, '25, M.I.T. Club President at Sarasota, and his wife. Emory is Council Representative of the M.I.T. Club of Southwest Florida. . . . **Jack Camp** in Mexico City writes: "As I have little of interest to write, I have

been reluctant to send in material for the Class column, but here goes an attempt to answer your questions in the order given in your letter. What doing: work, and trying to stay under 50 hours a week. Where been or are going: to the office before 8:00, lunch at the University Club and home for supper and bed, though I did make two working trips to Dallas this year. Who seen: not a member of the Class. Philosophy: a bit of good philosophy which is fast disappearing in this welfare age. Some years ago a childhood friend of mine had a . . ." and he goes on with a significant story, but it's one of those things—we'll just make copies of it and send it around!

Elizabeth Pattee reports living a very pleasant life in the Meadow Village retirement community of Hightstown, N. J., where she says: "There are some exceedingly interesting people here, who have done all kinds of things in their various occupations in many parts of the world, and life here can be quite lively. The proximity to Princeton is a great asset for there is a constant succession of the finest music, drama, ballet and varied entertainment there. All the general sociability and entertainment that we can take advantage of, and enough small architectural and landscape projects that occasionally come my way from former clients—I keep constantly busy." In June she expects to go to the biennial congress in Montreal of the International Federation of Landscape Architects (her field, at the Rhode Island School of Design, until she retired). The meetings have generally been in European cities and she has attended many of them, so that she has had a good opportunity to see in those cities the most recent developments in architecture and landscape and urban development.

The November issue of *Sunshine Magazine* gives a picture of **Dick Berger** in its "You Should Know" column. Here are excerpts of the article: "It is fortunate that there are men such as Richard G. Berger, who during most of his life has made a supreme dedication to the elimination of one of man's most insidious diseases—cancer—not necessarily by curing it, but by preventing it. Thirty years ago Dick Berger, after years of diligent research that revealed to him the most significant causes of cancer, issued the first publicity that advocated the prevention of the disease by guarding against those products and practices that lead to malignant cancer. Constantly and with increasing effectiveness, Berger issued convincing proof that victory depends on avoiding its causes . . . Today this man of intense devotion to the goal of cancer prevention heads his own organization, Cancer Prevention, Inc., in Bridgeport, Conn. Though supposedly retired from its active direction, he is constantly occupied with his life-long effort 'to do some good.' " . . . We acknowledge a card from **R. M. Kallejian** in reference to a Golden

Wedding Anniversary greeting. He writes: "Thank you very much for your thoughtfulness. We had 65 of our old relatives and friends to celebrate with us. My children and grandchildren were all here. Also thank the boys of the Class of 1916 for me."

Shaiswell Ober submits what he calls his biennial report which we always welcome: "Nothing different to report. I still go to M.I.T. a few days each week, otherwise we remain very close to home; hence my doings are of slight interest to the rest of the class. At the luncheon for professors-emeriti this fall, Professor Riley was there, talking as fast as ever, and our classmate, **Steve Simpson**, chemistry, seemed to be quietly enjoying himself. Besides I thoroughly enjoy the long columns that you two write, and I suppose edit, each month for the *Review*. Wish I could contribute more interesting items." . . . **John Gore** is doing what we hear many others are doing: "Keep thinking of the nice time we had at Chatham and keep looking forward to this coming June when we can again renew old friendships and, as a bonus, get into the middle of a sea-side clam bake with delicious steamed little neck clams et al." John continues his active interest in the Boy Scouts, for as he says: "With all the trouble we are having with 'hippies' and teenagers, the Boy Scout movement is all the more vital to the health of the nation; 'as the twig is bent, the tree is inclined.' We are trying to do a lot for the older boy and are making good progress." John's out-of-doors hobbies continue in season: birds, sailing, swimming, canoeing. He avers: "Being close to nature sure is a relief from politics and all the troubles in the world, a relief from nervous tension!"

Lev Lawrason reports much rain and cold weather in Seal Beach, Calif., in mid-December "but rain is what helps the dry country so I guess we should be happy. I am still in this retirement city of about 11,000 and like it. Spend much time visiting my two daughters, one in San Diego and the other in West Los Angeles. Had a letter from **Kem Dean** yesterday." . . . We have just had word and regret to report the death of **Horace Bickford** in a Bangor, Maine, hospital after a long illness. The Class expresses its deepest sympathy to Mrs. Bickford in Jonesport, Maine. . . . Finally, keep those dates in mind, June 7, 8 and 9 at Chatham Bars Inn; have the red blazer readied and away we'll go on our 52d. If you are planning to visit New York City try to arrange to be there on Tuesday noon March 5 or April 2 at the Chemists' Club, 52 East 41st Street, and join the 1916-17 group for, perhaps, one of the chef's golden bucks. Your secretaries appreciate the newspaper clipping help of Hank Smith and Ray Brooks, '17, and the prompt response of classmates requests for news and bits of philosophy. To keep the column full and interesting, write a little but write

often.—**Harold F. Dodge**, Secretary, 96 Briarcliff Road, Mountain Lakes, N. J. 07046; **Leonard Stone**, Assistant Secretary, 34-16 85th Street, Jackson Heights, N. Y. 11372.

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Know where Muscat and Omar is? It is from there that a letter from **Dix Proctor** is postmarked. It is on the southeastern tip of the Arabian Peninsula. Evidently it was the first stop Dix and Vi had made after leaving New York. Their ship had to go around South Africa as the Suez was closed. The voyage scheduled as a 115 day one appears to be for 140 now so they will be back the end of April. . . . Thanks to **Dick Loengard** we have word of the monthly 1917 luncheon meetings at the Chemists Club. These lunches are combined with 1916. In December we were represented by Ed Aldrin, Enos Curtin, Bill Hunter, Bill Neuberg and Dick Loengard while Caldwell, Gruber, Richman, Stern and Stone turned up for 1916. Only Dick and Bill Neuberg appeared for 1917 at the January 2 meeting with Barker and Evans for '16. January 25 sees the Loengards depart for St. Croix. . . . The **Ken Bells** have reservations on the *United States* and will be spending several weeks on Majorca. The Dunningtons expect to spend some time there also. . . . After the Reunion the **Bill Hunters** visited Expo '67 and enjoyed it but felt that the new concept in apartment houses as shown by "Habitant" would make **Jim Flaherty** start climbing walls. Most of January the Hunters will be in the southeastern states on "business and pleasure."

Professor **Alfred S. Niles** has a new address at 120 Cliff Street, Santa Cruz, Calif. 95060, and writes that he has copies of *Technique* 1917 and 1918 that he would be glad to donate to any M.I.T. organization that might want to complete their file. . . . The **Joe Littlefields** are in their new home at 10900 Snapper Creek Road, Kendall, Miami, Fla. 33156. . . . Dr. **Robert S. Mulliken** gives the new address of Physics Department, University of Chicago, Chicago, Ill. 60637. . . . Here it is January and a bit late to record activities of last summer. However, doings after the Reunion are interesting. **Pete Newell** spent a chilly time at Kennebunkport, Maine, and got back to Tampa in October. His wife and young grandson were going over to Italy to be with a daughter. Pete intended to follow later on. . . . From Boston the **Howard Melvins** went on to Maine, near Mt. Katahdin, then went on to California with a side trip to the Grand Tetons and are now back to golf, friends, family and the garden. . . . You know that news of the various classmates interests you. Let them have news of you by your sending word of your doings. Drop us a line now. In case you do not recognize this as a plea for notes, that is exactly what it is. We

want news.—**C. Dix Proctor**, Secretary, P. O. Box 336, Lincoln Park, N. J. 07035; **Stanley C. Dunning**, Assistant Secretary, 6 Jason Street, Arlington, Mass. 02174

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50th Reunion; Wianno Club, Osterville; June 7-10, 1968; for reservations: John W. Kilduff, P. O. Box 33, Amesbury, Mass.

As this column has maintained before in its stumbling way, there's something special about college classmates. I met **Ben Ballantine** (Rindge, N. H.) in what goes for a supermarket in our village. Knowing the comfort of old clothes, and caring little for the prestige of new ones, we agreed to strain our finances if necessary in order to attend our 50th Reunion. . . . **Ed Rossman** (Box 47 Paris, Maine) says there are only three Eighteeners in the whole state of Maine. He doesn't know about the others (**George S. Murray**, 52 Main Street, Thomaston, and **Arthur G. Carlson**, Hummingbird Hill, Waterford), but he'll be there. . . . A short note from **Henry M. Blank** (31 Canterbury Lane, Short Hills, N. J.) makes no commitments. He just says he is working with the Newark United Community Fund. Actually he's the Manager, and is further blessed with a son and a granddaughter. . . . **Jim Flint**, Capt. U.S.N. retired (262 Ashbourne Place, Columbus, Ohio), says he hopes, with luck, to make our 50th with wife Georgia. . . . **Johnny Clark** (8A Terrace Court, Tuscaloosa, Ala.), knowing that big stakes call out fangs and claws, says he "worries over Viet Nam, civil rights, riots, and inflation. They've given me a stomach ulcer. I'm auditing a course in pure mathematics at the University of Alabama and enjoying it. I have to laugh about the pure part. Any roving eye would realize that some irreverent fellow always comes along to corrupt the mathematical girl." . . . **Don Merrill's** widow, Ruth, writes concerning his children. David had a second son in August, Judy has four youngsters in all, Beth has a cute little daughter, Janice is teaching school in California. Ruth is in Florida for the winter with her father.

On the back of a fetching picture of himself and wife, Doris, **Rolfe Folsom** (19337 Almaden Road, San Jose, Calif.) says: "Two news begging letters from you, plus a few reminders of the 50 year Class Gift, have jarred my conscience, at least to the point of this note. I am retired though still President of Superior Blocks Inc. We have just moved to a home about 12 miles from downtown San Jose where, temporarily at least until the subdivisions catch up with us, we are in the country. It is a bit too early to be definite but we hope to be at Reunion. As you say, there's something special about college classmates." . . . **Malcolm Baber** (6625 Lincoln Drive, Philadelphia, Pa.) may be less nimble of foot than of yore, but is still swift of brain. Referring to

my attempt to bring an old nursery rhyme up to date (see December notes) he believes that, "As far as Philadelphia goes, your quatrain should read, Mary wears a mini skirt/But she is modest too/And so she wears her knee high boots/To hide her calves from view. To this we might add in rusty, creaking Latin, *Agnus Marie quis tollet speculatum homini semper idem*. Jean and I had a trip to the west coast where I served as a delegate to the annual convention of the M.O.W.U. Unfortunately, I picked up the Asiatic flu, so the planned leisurely return trip had to be cancelled. Otherwise, our quiet normal routine, completely lacking in pace or excitement, carries over from day to day. Let's have the best 50th the best class of M.I.T. could devise short of some jolly villainy." . . . **Clarence Fuller** (Foxboro, Mass.), now gulping a big mouthful of the past, writes: "For those who remember me as a boy, it is hard to believe that I have just passed the venerable age of 72. The records of the Foxboro Instrument Company of which I was long vice president in charge of sales, refuse to believe anything else. So, conforming to the established policy of reckoning by calendar instead of by arteries, ideas, or medical report, I am now pensioned like an old fire horse put out to pasture. Gosh, when I was a lad a pensioner was either a Civil War veteran or an old moribund railroad man listening for the whistle at the grade crossing. Such relics of the historical past were regarded with awe because they didn't have to work for a living. How attitudes do change. As I read the *Review*, there no longer seems any notoriety accompanying a retiree. Holding nature in thrall, I expect to be at the office on a reduced basis for a few more months. There are still some hot irons for me to get out of the fire before my industrial blaze goes out. Then I expect to be able to heat up a few irons of my own. One is to clean up my stamp collection, now neglected these many years. The family genealogy is on the home stretch. The whisper of ancestral voices goes back and back, disappearing somewhere in the middle ages."

From **Harry Camp's** widow comes the news that he died suddenly on November 4 in Southamptn, Mass. "He had survived a stroke last February from which his sense of humor and great determination had taken him an unusually long way toward recovery. This time he was hospitalized only one day, following a visit to his older son in Kansas." After graduation, Harry taught briefly at Phillips Andover Academy. During the 40 years he lived in Reading, Mass., he was an insurance agent, a master electrician, and sold pipe organs in addition to serving a number of churches as organist. He had a pipe organ of his own, which filled closets as well as portions of various hallways and rooms in his Reading home. Despite an accident which took off the ends of two fingers, he could produce a breath-holding performance on the key-

board. In 1963 he gave the organ to the Chapel at Williston Academy from which he graduated in 1914. Harry is survived by his wife, two sons, a daughter and six grandchildren. Ada Camp says, "I have many happy memories. I was lucky to have had 45 years with such a great guy." Yes, Ada, he was indeed a great guy, courageous, humming with accumulated vigor, eager and unflagging in his expectations of the future.—**F. Alexander Magoun**, Secretary, Jaffrey, N. H. 03452

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Karl Rodgers and Allegra returned in December, after spending 15 months abroad. Karl says they are already talking about their next trip abroad after the 1969 Reunion. While they were gone, their studio in Provincetown was broken into. Fortunately, nothing was taken but they brought a number of paintings to New York for safekeeping. One outcome is that the Babcock Galleries, 805 Madison Avenue, will probably have a retrospective show of paintings by E. Ambrose Webster (Karl's uncle) shortly after the first of the year. In March they will head for Texas to resume their Airstream travel trailer life. . . . **Dan Hall** has been retired for one and one-half years, after 50 years of active production and development in the pigment industry. He visits his eight grandchildren and their families often. . . . **Frank Adams** retired in 1962 from the Tennessee Valley Authority's construction division. He leads a quiet life, but is active in the local section of American Society of Mechanical Engineers. The chemical societies in Paducah are very active, due to growing chemical plants in nearby Calvert City. He hopes to make the 50th. . . . **Polly** and **Lou Grayson** spent several weeks in Europe last Spring with their daughter. They had a most interesting trip, visiting Naples and the Isle of Capri, Zermatt, Paris, and Rouen. Their daughter, Marilyn, has graduated from Syracuse University and is doing photographic research.

Dean Webster, as you may know, is the 1919 Class Agent. He was appointed after the death of **George McCreery** who represented us so ably for many years. You will probably hear from him with regard to our Reunion Gift. And by this time we have all received a letter from **Paul Sheeline**. He is working hard, and let's try to increase the class percentage of contributors. . . . We are just back from a month in South America where we flew to be with our daughter for Xmas. It was a most interesting and enjoyable trip. The Inca ruins at Macchu Pichu were fascinating, and the fact that they were located almost at the top of a mountain added to the beauty of the ruined city. Then a weekend in a farm village in Bolivia where we visited a native farm, a hand-operated sugar press, and a saw mill where they were cutting mahogany logs the size of redwood. We saw lovely Indian

singing and dancing. After that, it was the usual jump and run from one big city to another, except for three days in the lovely Argentina lakes—much like our Far West. We will be in Florida until April 1. Do come to see us if you are near. . . . We regret the death of **A. Lionel Reid** in October 1967. He was a lawyer and former mayor of Glen Ridge, N. J.—**Eugene R. Smoley**, Secretary, 1111 Casuarina Road, Delray Beach, Fla. 33444; Telephone 305-278-4537

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Your secretary's ancient heart was warmed by Christmas and New Year greetings from a few of you. From Chateau d' Arthies, Arthies, 95 Magny-en-Vexin, France, came a card from Denise and **K. B. While** with a cutout keyhole design through which could be seen a sketch (by K. B. no doubt) of their charming and imposing estate. . . . From Lakewood, Ohio, came greetings from Ilsa and **Chuck Reed**; from Hollywood, Fla., Winnie and **Frank Badger**; from New York City, Cottie and **Stan Reynolds**, and Stan writes: "We spent our summer vacation down east, starting at Wayside Inn, South Sandbury, Mass., then a few weeks in West Brooksville, Maine (near Blue Hill) and finally to Dorset, Vt. Played lots of golf but didn't improve my score any. Also toured the M.I.T. campus for the first time in many years, and had dinner at the top of the Prudential. Lots of changes since 1920 but also lots of the old familiar spots still there."

Homer Howes writes: "Vera and I stayed pretty close to St. Louis except about a month in Santa Fe, N. M., which was very interesting."

A note from **George Burt's** widow, Hilda, says: "I shall always remember the 45th Reunion at Stockbridge, and am so glad that the wives were invited and that I got to meet so many of the wonderful people that George had talked about through the years." George was one of the finest. We miss him. . . . **Ted Best** died early in January. He lived on Jericho Road, Scituate, Mass. He leaves his wife, Mildred, two daughters, Mrs. Barbara Merrill of Madison, N. J., and Mrs. Janer Messinger of Marshfield, Mass., and five grandchildren. . . . A touching note from Bruce Buckland who has finally returned to his home at 1711 Randolph Road, Schenectady, says: "Through most of this year as I've seen such things as squirrels building their nests of leaves high in an elm, or a bright new moon—familiar things that to me will be forever Florence's—I've thought of her. Interwoven in my mind were thoughts of you, all her other classmates, and the kindness of all of you in comforting me. It is no surprise to me that she is remembered with fondness, but it is a great comfort." Ours was a proud and fortunate class to have had our Flusie for so many years. That all of us shall continue to remember her

with fondness and warm affection goes without saying.

A welcome card from **Bud Cofren** gives the news that the Cofrens have moved from Winter Haven to 2631 Pagoda Drive, Clearwater, Fla. Bud says he has been seeing **Scotty Wells** as Scottie's daughter Barbara is now a charming neighbor in Clearwater. . . . **Adin A. Brown** writes that from November to May his address is 1800 N. Stanton, El Paso, Texas, and from June to November is West Harwick, Mass. During March and April when the desert winds near the border bear dust and gravel, the Browns escape to Phoenix and Scottsdale, Ariz., for a few weeks. Enroute both ways they visit with grandchildren and their parents at Salt Lake City and New Orleans. "Of 15 grandchildren," says Skeets, "13 are with us at various intervals at Cape Cod and, to avoid claims of partiality, we permit them to bring their parents." I mentioned last month that so far as I knew **Frank Bradley** held the class record of 14 grandchildren. How about it, Frank? Do the Browns beat the Bradleys or has your family roster increased since Reunion?

Let me not forget to mention the attractive and thoughtful Christmas greeting from Pat and **Buzz Burroughs** of Topsfield, Mass. And earlier I got a card with a picture of the handsome Caravelle Hotel at Christiansted, St. Croix, Virgin Islands, from, you guessed it, none other than "**Marco Polo**" **Reed** who was trying out the new hotel. Chuck said he had spent Thanksgiving with his son, Edwin, M.I.T. '45, in Houston. Edwin is Vice President of the alumni club there. He has provided Chuck with three grandchildren, two girls and a boy. To balance the family Chuck has another grandson in Williamsburg, Va. . . . **John Crowley** says he has spent the last eight years in Tequesta, Fla., golfing and fishing and traveling during the summer months. He retired as Director of Aeronautics and Space Research from the National Aeronautics and Space Administration in 1959.

Jim Wolfson of 342 Beach 142nd Street, Neponsit, Long Island, retired from Tishman Realty and Construction Company where he was Vice President last July. He quickly discovered that his services as a construction consultant were in active demand and has been able to take his pick of interesting commissions but now finds time to winter at Palm Beach. Jim recently wrote a paper on low cost housing that has attracted much favorable attention in construction and government circles. He points out that "we are satisfying the needs of our people for low cost housing at an efficiency rate of about 20 percent or, in other words, we should be moving about five times faster. As a partial remedy Jim suggests coordination of city, state and federal authorities in criteria, outline specifications and materials with financing procedures the only difference in their programs. Jim

says he is looking forward to our 50th. He has an interesting and timely tip for all of his classmates and that is that they read a Simon and Schuster book by Henry Legler entitled *How to Make the Rest of Your Life the Best of Your Life*. Sounds promising!

From my faithful friend and colleague, "Cac" Clarke, Secretary of the Class of '21, comes welcome news of our classmate **Eric Etherington**, now a resident of Leisure Village in Lakewood, N. J. Eric, who before retirement was an investment advisor for Bache and Company and lived in Glen Rock, has been playing Santa Claus at the Lakewood Chamber of Commerce's Christmas headquarters and, according to the Asbury Park *Evening Press*, enjoying every minute of it. It was good to hear about Eric thus indirectly. Now, how about writing us, Eric. . . . I should not fail to mention the nice Christmas greeting from Betty and **Norrie Abbott** as well as a much appreciated New Year phone call from Norrie at his home, 169 Brown Street, Providence. Norrie is talking up the M.I.T. Fiesta in Mexico City which is to be held just after these notes appear. 'Twould be nice if I could report a gathering of the Class there this year or one of these years. It's a grand event. . . . Add one more to the Florida clan—the **Jim Gibsons** who are now in Sarasota after spending the summer at their lovely home in South Brookville, Maine. And speaking of Florida, we wonder how many classmates attended the First Florida Festival of M.I.T. Alumni on January 27 in Orlando. We note that **Robbie Robillard** of Sarasota was on the program and publicity committee for this gala event, and hope he'll give us a report. . . . **Sidney Griffin** may be reached at 33 E. Washington Boulevard, Lombard, Ill. **George Knight**, President of the George Knight Company of Brockton, Mass., resides at 161 Moraine Street, Brockton. **William H. Preston** has been located at 131 Nogel-San Ramon, Rio Piedras, Puerto Rico. **James H. Scott** is at 313 Lock Lane, Richmond, Va. **Dick Gee** is wintering in Florida, address 6711 N.W. 15 Court, Hollywood. . . . It is with sorrow that I announce the death of **Ralph Abercrombie** of Springfield, Mass., last November.—**Harold Bugbee**, 21 Everell Road, Winchester, Mass. 01890

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It's exhilarating to read the *New York Times* for January 8 and note the various items relating to M.I.T. and its eminent activities, particularly the indication of its strategic geographical importance at the "center" of Route 128 and its proximity to Technology Square. We hail the recognition that Technology is the most important single factor in the entire Greater Boston area. The import of the *Times'* review was not lost on the families of young men who are prospective freshmen from our area, one of whom excitedly telephoned to inquire

whether we had seen how the newspaper had "spread M.I.T. all over the issue." . . . Extra! The Class of '21 has lost a most eligible bachelor and gained a Benedict! Upon receipt of the usual beautiful card of Christmas wishes from **G. Howard LeFevre** of 20 Gloucester Street, Boston, Mass. 02115, we were electrified to note it had been signed by Eileen and Howard. Under date of December 23, 1967, Moose writes: "Eileen and I have your note and we thank you for your congratulations and best wishes. We were married in Boston on June 19, 1967, and for the present we plan to stay here. We have known each other for many years, both having worked for the United States Smelting Company in New York and Boston. I retired in June, 1965, as vice president and manager of metal sales after 30 years of very pleasant and interesting work. The reason I have not been available for many '21 reunions is that about the time they were held I would either be out West or off on other company business—and in the metal business there is never a dull moment. I have been aware that you had retired from I. T. and T. and had moved to Brielle. I assume and hope you and Maxine are both enjoying your well-earned leisure. However, I don't think you have much leisure so far as the Class News is concerned. To me, you do an outstanding job for they are the most complete notes of any of the classes that appear in the *Review*, and I have seen about every *Review* that has been published since we graduated. I really haven't much news. Over the years I have been active in business and professional work and about the only thing of outstanding interest would be our marriage, which I wish had happened many years ago. We did have a nice Christmas note from Claudia and **Josh Crosby**, who live in Wellesley; saw them about a year ago. Our best wishes and kindest regards to you and Maxine." We repeat our hearty congratulations and good wishes and those of the Class of '21 and express the hope that Eileen and Moose will join us at Alumni Day next June to be welcomed as regular members of that friendly and faithful group of men and women who participate in all '21 gatherings.

A year-end note from Kay and **Phil Nelles** of 21 Sunset Road, Stoneham, Mass. 02180, says, in part: "We made several short sojourns to our place at Marstons Mills on the Cape last summer. It was a cool and wet season. We had a pleasant visit with **Edward F. Praetz** and his wife. Ed will soon be retiring from teaching mathematics in the Lawrence High School, Lawrence, Mass., these many years. It has kept him tied down so that there has always been a conflict of dates at the time of Alumni Day. We also had a good time reminiscing with **Paul A. Morgan** of Lawrence, Mass., who is real chipper and still dragging on that old pipe. We hope you and Maxine enjoy the holidays and wish you the best of

health in the New Year." Loyal Phil is spending a great deal of his time actively soliciting participation in the Amity Fund to assure that our 50-year Gift to Technology will be adequate for that important occasion.

Writing on the stationery of L. C. Pelkus, Inc., electric heating specialists and Chromalox heating unit representatives of 204 Worcester Street (Route 9), Wellesley Hills, Mass. 02181, **Leo Pelkus** says: "Can't remember whether I returned the personal data form in '66; if you find that I didn't, please shoot me another blank. Am thoroughly enjoying 'semi-retirement,' having sold this active electrical sales engineering operation, now almost 30 years old, to one of my capable younger associates with the proviso that I can and will continue working a couple of days a week or so. Thus, with all pressure and responsibility removed, I can work or play golf or anything else I feel like doing. It's fun. Vivian and I still like New England, but we do leave Wellesley for Key Biscayne, Fla., for a month every winter. Our older daughter, Diane, Wellesley '65, will get her doctorate at Yale in about a year. Our younger girl, Dori, received her degree in mathematics last June at the University of Colorado. All of which means that Vivian and I may soon be catching up on some extensive traveling. Our home address remains: 18 Priscilla Circle, Wellesley Hills, Mass. 02181. **Herb Reinhard** just dropped in on us for a nice long chat. Our kindest regards to you and Maxine." About that traveling, Vivian and Leo, we're trying to stir up interest in a third '21 reunion in Mexico at the Fiesta of the M.I.T. Club of Mexico City in 1969. How about it?

Year after year, Maxine and your Secretary bask in the warmth of your grand cards and cordial messages during the holiday season and never cease to marvel at the increasing number of classmates and other M.I.T. dear friends who take the opportunity to wish us well and to add to our much-needed supply of news for these columns. We hope you had a joyous time and that this year of 1968 will bring good health and much happiness to you and yours. We most cordially acknowledge sincere thanks to Anne and Wally Adams, Olive and Ollie Bardes, Elizabeth and John Barriger, Ednah Blanchard, Ray Brooks, '17, Bruce Buckland, Mary and Buck Buckner, Harold Bugbee, '20, Ethel Burckett, Jack Cannon, '24, Deborah Carcier, Marion and George Chutter, Mary Louise and Rich Clark, Edna and Phil Coffin, Clara and Asher Cohen, Sarita and Gonzalo Docal, '44, Harold Dodge, '16, Maida and Ed Dubé, Helen and Ed Farrand, Catharine and Harry Field, Eddie and George Gokey, Betty and Morry Goodhart, '35, Margaret Goodhue, Peter Gwynne, Doris and Bob Haskel, Alex and Munnie Hawes, Betty and Sumner Hayward, Betty and Dug Jackson, Ruth and Irv Jakobson, Sam Jones, Marge and Jack Kendall, Ruth King,

Laurie and Chick Kurth, Eileen and Moose LeFevre, Emma and Al Lloyd, John Mattill, Milicent and Joe Maxfield, '10, Helen and Bob Miller, Kay and Phil Nelles, Karen Oddo, Muriel and George Owens, Conchita and Harry Pearson, '23, Marty and Bill Ready, Dale Reeves, Freda Rich, Graciela and Helier Rodríguez, Helen and Ray St. Laurent, Anne and George Schnitzler, Madeline and Rufe Shaw, Pamela Shea, Margaret and Bill Sherry, Muriel and Eric Smith, Edith and Harry Thomas, '25, Helen and Lem Tremaine, '23, Louise Tucker, Dorothy and Joe Wenick, Ruth and Ralph Weststen, India and Dave Woodbury, and Dick Wright. We'll quote some of the welcomed messages in this and later issues. . . . No doubt you have already found extensive use for the new *M.I.T. Alumni Register*, as we have. If, by chance, you forgot to order a copy, contact the Alumni Office for one of the few remaining ones.

One of the most unusual, distinctive and welcome Christmas presents we have ever received came from Betty and **Sumner Hayward**—a lovely wall-type cloth calendar, picturing a nostalgic scene of red barns, silos and an ancient Model T delivery van bearing the name of "Hickory Farms of Ohio." What's so unusual? Would you believe the year printed at the bottom is "1921"? Thanks to a most thoughtful pair. Betty wrote, in part: "Sumner thinks you may like to have a copy of the note Celia and **Frank E. Huggins, Jr.**, included on their Christmas card: 'We have bought property on the coast of South Carolina, east of Beaufort and a little north of Savannah, called the Caroline Sea Islands. When we wind up our affairs here, we will go there and restore the house and start on what we call a prolonged vacation. Frank will continue at the office until we sell our property here.' " The current Huggins address is Mather Lane, Hunting Valley, Chagrin Falls, Ohio 44022. **Munnie Hawes** also phoned to give us this news of the move planned by Squeeze, who was best man at Munnie's wedding. Betty and Sumner will stay with us overnight in Brielle so they, the Hawes couple, Maxine and your Secretary and, hopefully, neighbor Ed Aldrin, '17, can attend the January 30 dinner meeting of the M.I.T. Club of Northern New Jersey at the nearby Bell Telephone Laboratories buildings in Holmdel, N. J. . . . Inadvertently, we omitted the name of **Don Morse**, Chairman of the Massachusetts area 50-year Gift Committee, from last month's list of those attending the '21 officers' meeting in Cambridge during December.

For many years one of the most interesting and useful gifts we have received at year-end has been the official programs of the Tournament of Roses Parade and the Rose Bowl Game, which Marge and **Jack Kendall** have regularly sent from their home in South Pasadena, Calif. Now that we can see

both events in color, the television program has taken on added beauty and the printed programs—also in color—enable far greater appreciation of the details of the parade and the game. Again, our sincere thanks go to 401 Hermosa Place, S. Pasadena, Calif. 91030. As we reported last month, Ruth and **Irv Jakobson** enjoyed these two major New Year's Day activities as guests of the Kendalls. . . . Speaking of Jake, we note in the press that two vessels, the *Rude* and the *Heck*, both constructed at the Jakobson Shipyard, Oyster Bay, N. Y., are now covering the Atlantic coastline for the Coast and Geodetic Survey. Towing a slack steel wire between them, the two 90-foot ships locate submerged hazards, such as wrecks and high rocks, which are caught by the wire. . . . **Joe Wenick** tells us he just completed the requirements for a New Jersey Professional Engineer's license. . . . Will some kind '21ers please tell us which of our classmates attended the M.I.T. Florida Festival last January 27 and the three big events this month—the Regional Conference in the Delaware Valley, the Fiesta in Mexico and the Regional Conference in Dallas? . . . Those of the Class who have visited Maxine and your Secretary in Brielle and have seen her studio and art work will be interested to know she was invited to set up a "solo" exhibit of some 40 oil paintings and pastel portraits during the month of January at the galleries of the Asbury Park Society of Fine Arts. The exhibit was formally opened with her demonstration of pastel portraiture techniques to the members of the society. She has received excellent notices.

William J. Sherry, 1801 First National Building, Tulsa, Okla. 74103, sent a grand letter saying: "When I picked up the December *Review*, I was surprised to find my name in raised print, but I do appreciate the nice things you said to such an extent that I abandoned my inherent modesty by taking it home to show Margaret and Teresa. Teresa is now a premedic junior at the University of Tulsa and Dick is a business management junior at Notre Dame—the last of the eight for whom I have had tuition responsibilities. Those of us who married in the 20's certainly got in ahead, for the most part, of the prohibitively high expenses today for college. I was happy to read that Graciela and **Helier Rodríguez** were in the United States this past year and that they looked so well. Margaret and the family extend to Maxine and you our affectionate regards for the Christmas season." Ed Aldrin, '17, phoned that he talked to Bill by phone when in Tulsa recently but did not get a chance to see him. Harold Bugbee, Secretary of the Class of '20, writes, in part: "I attended the Alumni Officers' Conference in San Francisco and had a most enjoyable two days, including lunch and a good visit with Bill Sherry." We thank Harold and sympathize with his plaint in the January *Review* that the

Alumni Office "classnapped" Tony Anable, '20, into the '21 ranks. It was also good to read that Tony, Buzz Burroughs, '20, and **Dan Harvey** cruised on Chesapeake Bay together last summer. It should be noted that Dan was then, and still is, as he has been for the last 50 years, a loyal member of the Class of '21, although the bold-faced type in the note inferred otherwise. Those gremlins that thus occasionally plague the *Review* have done another dastardly deed to our January news by switching Emma and **Al Lloyd** to the Class of '24. We apologize to this fine couple for their unwarranted demotion. The gremlins must have fled before they could make a corresponding alteration in the Lloyd's address from 35 Spruce Street, Westerly, R. I. 02891, but, unfortunately, in their haste, they also succeeded in knocking all the accents from the Dubé and Rodríguez names and in trampling the cognomen of our Assistant Secretary back into ignominious light-face type! It's interesting to note in the '17 notes in the January *Review* the question regarding Luis J. Bacardi, '17, who heads the famous Compania Ron Bacardi S. A. de Mexico, Mexico, D. F. Señor Luis personally conducted the group of us attending the Fiesta of the M.I.T. Club of Mexico City last March from the San Martin Seminary museum in Tepotzotlan to his huge new plant, where he was a gracious host in having us served with a wide variety of delicious rum drinks at a long bar in the gorgeous gardens at the entrance to the plant. All of the large '21 group who attended our interim reunion in Mexico owe Luis a sincere vote of thanks.

The board of directors of Moleculon Research Corporation, a research, development and engineering firm of 139 Main Street, Cambridge, Mass., has elected **John J. Healy, Jr.**, a vice president of the corporation, according to an announcement received from the President, Arthur S. Obermayer, '56. . . . **Elmer W. Campbell**, Box 3, Lovell, Maine, who has retired as the Director of the Division of Sanitary Engineering of the Department of Health and Welfare of the State of Maine writes: "President Howard W. Johnson was the guest speaker at the meeting of the M.I.T. Club of Western Maine last October. Present from the Class of '21 were Col. and Mrs. **Philip M. Johnson** of Portland and Dr. and Mrs. Elmer W. Campbell and our son Roy of Robinhood. **Ed Clark** of Damariscotta and **Dave Woodbury** of Ogunquit sent their regrets." Elmer says that they will spend the winter at 8894 112th Street North, Seminole, Fla. 33540.

George A. Chutter, our 50th Reunion Chairman, has become a most welcome regular contributor to these columns. Writing from his home on Boulder Drive, Box 305, East Dennis, Mass. 02641, he says: "We hope to have son Roger and his wife Karen with us some time during the holidays. A card from Ruth and **Harold Cake** tells

of their trip to Expo 67 and also says that **Bill Matthews** of Richland, Wash., is about to come out with a new cruiser. This seems to be entitled to an award for sustained business activity. Harold comments that they keep busier longer in the West.

Word from Wilma and **John Scott** is that they are wintering at 3015 N. Halifax Avenue, Daytona Beach, Fla. 32018. . . . Had a note from **Fritz Ferdinand** that promised a visit to us when he and Eleanor were next on the Cape." . . . Another dependable reporter, **Robert F. Miller**, 7910 Birnam Wood Drive, McLean, Va. 22101, writes: "We have a houseful for the holidays, with our son, his wife and two children and Helen's two sisters and a cousin. Our second youngest daughter, Kathleen, is here from Mexico City and will return there in January. Our youngest daughter, Jeanie, surprised us a few days ago when she told of her impending engagement to Frank Sando, a junior studying law at William and Mary College. The wedding will be some time next fall, before school starts. **Larry Conant** planned and served as moderator for a panel discussion on the subject of 'Problems of an Urban Society,' sponsored by the M.I.T. Club of Washington. Helen's wrists are healed and she plans to resume her golf next spring. We are hoping that Graciela and Helier Rodríguez will be back next spring or summer for another visit." Bob's letter is the more appreciated for his having taken time on Christmas Day to write to us.

With deep sorrow we record the passing of **John Margeson McClelland**, 89 Stratford Avenue, Pittsfield, Mass. 01201, on December 11, 1967, and express to his family the sincerest sympathy of the Class of 1921. Mac was born in Jamaica Plain, Mass., on December 10, 1899, and prepared for Technology at the Chauncy Hall School. At the Institute, he was active in the Mechanical Engineering Society, the Chauncy Hall Club, the Technology Athletic Club and the '21 track and tug o' war teams in our freshman year. During World War I he was a private in the S.A.T.C. at M.I.T. He was graduated with us in Course II and joined the construction department of the General Electric Company, Pittsfield, Mass. He retired from General Electric in 1964 as manager of transformer installation and service engineering. A 33d degree Mason, he was past master of Mystic Lodge and a former president of the Berkshire Shrine Club. He is survived by his wife, the former Kathryn V. Caldwell; a son, John M., Jr., of Rockville, Conn.; and a sister, Grace McClelland of Boston. . . . The notes in these columns have been furnished for your edification by a number of your classmates. With longer days and better weather in prospect, won't you take a few moments to help us tell those other classmates about you, your retirement or business activities, your family

and your travels? It would be a big help for us and a lot of interest for them. Please write us now. And don't forget to schedule a trip to Cambridge on Alumni Day, June 10, so you and your wife can join our '21 group.—**Carole A. Clarke**, Secretary, 608 Union Lane, Brielle, N. J. 08730; **Edwin T. Steffian**, Assistant Secretary, Edwin T. Steffian and Associates, Inc., 19 Temple Place, Boston, Mass. 02111

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Confession is good for the soul, therefore, your Secretary confesses that winter arrived in Buffalo on January 4 with four inches of beautiful snow. However, our ski slopes, 20 miles south, have received enough to insure continuous enjoyment for the rest of the month. We also received just enough snow on the day before Christmas to insure Santa's arriving on time with beautiful effects on the trees and shrubs. Later in January your Secretary will survey the weather and Classmates in Florida in his usual official capacity. In April he is planning the annual Chamber of Commerce Trade Mission including a visit to Hungary, Yugoslavia and the U.S.S.R. . . . Our Class Agent, **Dale Spoor** has sent an encouraging report of contributions toward our 50th Reunion Class Gift. He sent a clipping and photo of **Horace McCurdy**, a 33d degree Mason of Washington state, who has been selected to receive the highest honors from the Supreme Council, the Great Cross, Court of Honour, an award given for "signal services and unusual merit." Our congratulations go to Mac and his family. . . . **Donald F. Carpenter** has written from Mendenhall, Pa., reminding us of the 50th Reunion and our own long range planning activity corresponding to the work which he started as President of the Alumni Association. You may be sure that Don will be busy advancing this cause. . . . We find that **Edwin A. Gruppe** has retired as Division Power Engineer from Niagara Mohawk Corporation. Ed was formerly President of the M.I.T. Club of Central New York and Chairman of the Educational Committee for 25 years. He also organized the first radio chain broadcast dinner at Utica in 1928 and was President of the Utica Club.

James L. Truslow has presently retired, spending his summers in Maine and winters at Hatchet Bay, Eleuthera in the Bahamas. He spent six months last year in Brazil as textile consultant for U.S.A.I.D. . . . **A. Ponce Canton** is Chairman of the Board of Banco de Yucatan, S. A., and Chairman of Cerveceria, Yucateca, S. A. . . . We also find that **M. Thornton Dow** has been retired for some years from the Bell Telephone Laboratories. . . . Congratulations to **Robert Tonon**, President of the Peter Gray Corporation of Cambridge, Mass., as honorary member of the Associated Industries of Massachusetts. . . . **Adolph B. Alland** is solving puzzles in the Technology Review from

his home in San Rafael, Calif. . . . **Lee D. Warrender** has been awarded accolades by *The Naval Star* for his secret of successful retirement by keeping busy. The reporter states "one leaves this man with a sense of amazement at his energy, his vitality and his great passion for living and learning." Lee not only repairs the long gone art of cloisonné but makes furniture too. He creates lovely pieces, including Duncan Phyfe chairs with the finishing touch of needlepoint by Mrs. Warrender. He also makes furniture for their home in Babylon, Long Island. In the past he has taught mechanics at his Academy of Aeronautics at LaGuardia, which has turned out approximately 50,000 skilled mechanics in the field of aviation. Mrs. Warrender is just as busy with her organ music and organizations both at Naples and Babylon. This most complimentary write-up is certainly well deserved.

Paul S. O'Brien of Baton Rouge retired from Mobil Chemical Company in 1965 and made a two-month European trip in 1966. While there he gave a lecture on "Alcoholism" at an International Meeting in Prague. He is now doing consulting work for Socony Mobil and writes articles for Irish magazines in Dublin. . . . We have been informed of an attendance of 2,000 during the showing of **Oscar Horovitz'** color film "The Tourist's Russia." This was noted in the program for December of meetings held in the University of Arizona auditorium. Oscar is the only American Five-Star Motion Picture Exhibitor in the Photographic Society of America. . . . We are delighted to hear from Madeline and **Parke Appel** with a report of their trip through Bavaria, Austria and Switzerland. They enjoyed excellent weather as proved by the brilliant coloring in their hundreds of slides showing the beautiful area. Parke has been attending Council meetings and visiting with Warren Ferguson, Bob Tonon, Oscar Horovitz, Yardley Chittick, Ted Miller and Bob Brown. He also had meetings with Dale Spoor and Don Carpenter regarding our Class activities. Discussion included problems of entertaining outside groups at the Wianno Club in regard to certain tax exclusions so the Wianno Club can't take us. Soon the decision must be made whether to have our Reunion on campus or select a nearby summer hotel. It is important that we all write to Parke Appel, Box 137, Dover, Mass. 02030, regarding preference of location for our 50th. We herein voice the enthusiasm and thanks of our Class to Parke and his constant endeavors in our behalf.

The sympathy of the Class is extended to the family of **G. Everett Farmer** of Signal Mountain, Tenn., who died last October. He had been with T.V.S. for many years, and retired in 1963 as Chief of Communication Engineering and Branch design. He was a member of many engineering and local organizations, having been honored with the

Silver Beaver award of the Boy Scouts. . . . Our sympathy is also extended to the families of Harry M. Noelke, Mertzon, Texas; Gertrude C. Thompson, Sarasota, Fla.; Homer L. Bigelow, Jr., Santa Fe, N. M.; John B. McCue, Summersville, W. Va. . . . Among those whose addresses have changed are the following: Dr. Chih T. Chu, Lowloon, Hong Kong; Col. Dabney H. Maury, Fairfax, Va.; R. A. Stone, New Fairfield, Conn.; Maximilian W. Killars, Arcadia, Calif.; Joel D. Harvey, Portland, Maine; Benjamin W. Thoron, Washington D. C.; Albert E. Smith, Venice, Fla. . . . And now your Secretary goes back to speech writing for the 124th Annual Banquet of the Buffalo Area Chamber of Commerce. He will respond with as much modesty as possible to the "Man-of-the-Year" award. In the meantime, good skiing, good health and good times to you all!—**Whitworth Ferguson**, Secretary, 333 Ellicott Street, Buffalo, N. Y. 14203; **Oscar Horovitz**, Assistant Secretary, 33 Island Street, Boston, Mass. 02119

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45th Reunion; Blue Water Resort Hotel, Bass River; June 7-10, 1968; for reservations: Forrest F. Lange, 1196 Woodbury Avenue, Portsmouth, N.H. 03801

First, all classmates are referred to the Class of 1923 news section of the February, 1968, issue of *Technology Review*. This is our 45th Reunion Year and that issue contains the latest information on our plans for the Reunion, June 6-9, 1968, at the Blue Water Motel, 328 Winter Street, Hyannis, Mass. Please mark those dates on your 1968 calendar and watch for future class mailings. . . . The Associated Industries of Massachusetts has elected new officers and directors for 1967-68. Our Class President **Dave Skinner**, Vice President and General Manager, Polaroid Corporation, a past president and director of the Cambridge Chamber of Commerce, and presently a director of A.I.M., has been elected a Vice President of A.I.M. . . . **Bert McKittrick** reports: "We are planning on being at the Blue Water Inn June 6-9, though my youngest brother's daughter is being married on June 8 in Charlotte, N. C. Enclosed is a letter that came with **Roy Sterling's** Christmas card accounting for their travels and activities.

Roy says that in January, 1967, they visited the West Coast and spent five days in San Francisco. While there he attended the convention of the National Concrete Masonry Association. Then they flew to Honolulu, "a trip we have wanted to make for years. After eight glorious days at Waikiki Beach, many sight-seeing trips and some fabulous parties, we boarded the S.S. *Lurline* for a tour of the outer islands. This was a terrific trip. We picked orchids, inspected volcanic craters, saw acres of sugar cane and pineapples and walked on the famous Black Sand Beach.

At each island we had a real 'Aloha' welcome and send-off with the island's best string orchestra and hula dancers performing for us. We stayed on the ship for our return to Los Angeles, with Disneyland and the movie studios as the main attractions. At Las Vegas Mary got a sore arm from playing the one-arm bandits. From here, we flew to Phoenix, Ariz. In August we flew to Athens, Greece, where we dined at a table next to the King and Queen on our first evening there. We spent five days on the *M/V Delos* visiting the Aegean Islands. We spent 24 hours in Beirut, Lebanon, where I spent most of my time as a consultant for a block plant. From there we flew to Zurich, Switzerland, and started on a tour through the mountains. We went over two passes, inside two glaciers and up the famous Jungfrau. In Montreux we visited Chillon castle made famous by Lord Byron in his "Prisoner of Chillon." A boat trip on Lake Geneva to Geneva ended our Swiss tour. Next we flew to Barcelona, Valencia and Madrid in Spain. We weren't too impressed. We did, however, fall in love with Portugal; its climate and beauty far surpassed our expectations. Both of our trips were fun, they were interesting and exciting. We saw old friends and made some new ones, but we were glad to get home to our own place and our lovely water view." Roy is building a new plant on a 10-acre site in Warwick. The larger building will give him room for automating some of his equipment and he will have more space for storing his materials. This is something he has wanted to do for many years. We hope the new plant will be in operation by the middle of February (1968) as we are planning to go to Florida about that time. It is always nice to get away from the ice and snow and to see our friends who are living there. We both send our best wishes for a happy holiday season. Hope to see you next time.

George W. Bricker reports that he is returning home after two and one half years in Pakistan as Chief Technical Advisor to the Investment Advisory Center of Pakistan. "Expect to arrive in New York about February 10, 1968, after a six-week trip through the Pacific area." . . . **George A. Johnson** reports that he is self-employed, has three children and six grandchildren and his special interest is in the Gold Standard. . . . **Salvatore A. Guerrieri** reports that he has retired. . . . **Robert L. Hershey**, Chairman of the "Chemistry in Industry" study, recently met in Washington with Dr. Charles C. Price; Representative Emilio Q. Daddario, Chairman of the House Subcommittee on Science, Research and Development; and representatives of the National Science Foundation regarding the proposed study. . . . **D. G. Brinton Thompson** becomes Professor Emeritus of History at Trinity College this spring after teaching there since 1945 and serving as Chairman of the Department of History from 1948-1967; he is listed in *Who's Who*. . . . **Dorothy W. Weeks**

is Spectroscopist, Solar Satellite Project, Harvard College Observatory, and Lecturer in Physics, Newton College of the Sacred Heart, Newton, Mass. Dorothy reports that in the spring of 1967 she travelled in Rome, Iran and Athens; and in the summer in Scotland, Scandinavia, Prague and London.

A Christmas card and note from **Herbert L. Hayden** reports that Kay was operated on the 7th of December and sends her best wishes from the Philips House of the Massachusetts General Hospital in Boston. Several months of recuperation will be necessary. "Kay was unable to play tennis this year but she has done some gardening, some rug hooking, some knitting and we have both played some bridge." Herb played hockey twice a week during the winter (1967), played in several senior tennis tournaments in New England during the summer, and bowled in two leagues. Between February 12 and April 3, 1967, they had a fine trip to Florida, Texas and Mexico, and made family visits along the way in Upper Montclair, N. J., and Rockville, Md. They joined a group on a Cartan Tour of about two weeks duration, which took them to San Miguel Allende, Guanajuato, Guadalajara, Patzcuaro, San Jose Purua and back to Mexico City. They then joined the 19th M.I.T. Fiesta for the last three days of the week. There were approximately 100 M.I.T. graduates and their wives and "we had a fine time climaxed with a big dinner—Mexican type—in the garden of one of the estates in Mexico City." They flew to Houston, Texas, then back to St. Petersburg, then to Hickory, Tenn., Maryland, and New Jersey to visit friends. Herb's Christmas card was, as usual, unique. It included a map showing the places visited, together with 13 pictures taken on their trip keyed in to the places where the pictures were taken.

Peter V. Martin reports that he retired August 31, 1967, as Vice President of the Kippers Company Inc., Pittsburgh, and is now a farmer raising blueberries. . . . In the *Technology Review* your Secretary notes items relative to **Theodore M. Edison**, with whom he played considerable tennis and who often submitted puzzles to his classmates, usually at noon lunch. It is observed that Ted is still enjoying that activity; both by submitting a puzzle on page 76 and by commenting on a puzzle, number 79, on page 77 of the January, 1968, *Technology Review*. . . . Notice has been received of the following deaths, however, no further details are available at this time: **A. Giffin Ashcroft**, Chimney Point Road, New Milford, Conn. 06776, on June 24, 1967; **Leo V. Goriansky**, 148 Main Street, Andover, Mass. 01810, on August 8, 1967; **Ivan L. Tyler**, Tucson House, Apt. 602, 1501 Miracle Mile, Tucson, Ariz. 85705, on October 4, 1967.

The Alumni Office reports the following changes of address: **Charles R. Bailey**,

1951 N.E. 39th Street, Lighthouse Point, Fla. 33064; **S. Charles Dearsyne**, Kelly Pittelko, Fritz and Forssen, Lloyd Building, Seattle, Wash. 98104; **Robert L. Hershey**, P. O. Box H, Kenneth Square, Pa. 19348; **Olcott L. Hooper**, Vershire, Vt. 05079; **Julius A. Stratton**, The Ford Foundation, 320 East 43d Street, New York, N. Y. 10017; **Hou Y. Hsu**, 2188 West 32d Avenue, Vancouver 13, Canada 9 C.A.; **Miles Pennybacker**, Box 306, Westport, Conn. 06880.—**Forrest F. Lange**, Secretary, 1196 Woodbury Avenue, Portsmouth, N. H. 03801; **Bertrand A. McKittrick**, Assistant Secretary, 78 Fletcher Street, Lowell, Mass. 10852

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As these notes are being written the temperature is hovering around zero. It was six below early this morning and had quite a struggle making it all the way up to zero, and high winds are blasting it through every crack and cranny, discovering new ones in addition to those that had been obvious in this old house. This morning at dawn the oil burner quit for a bit, so it is with mixed emotions that your Secretary re-reads all the little notes of cheer from you happy sojourners in southern climes. . . . **Walt Gress**: "Wishing you a Merry Christmas from partly cloudy Florida (West Palm Beach). Why freeze up north when one can sweat down south?" . . . **Bill MacCallum**: "Sandy and Ben (daughter and son-in-law) are leaving with Eleanore and me on December 26 for two weeks in Hawaii." . . . **Ray Lehrer**: "We are off to the western Mediterranean this winter with a few stops in Europe. Must look up some new bars and will bring you up to date on them later." . . . **Percy Wilson**: "Just returned from a three-month trip to Tahiti, New Zealand, Tasmania, Australia, New Caledonia, Fiji, Tonga and Samoa, thereby satisfying a curiosity of many years standing." (Note: The Wilsons have returned, yes—but since they returned to their home in Carmel, Calif., they're definitely included with the happy people.)

We told you a month or two ago about **Hudson Hoagland's** researches on martinis. Now comes report of a paper he gave at a Bates College conference titled "Regulation of Population in Some Animal Species," based on an article of his, "Cybernetics of Population Control" which starts with the fruitful drosophila and goes right up through man. The doctor certainly has varied and intriguing interests. . . . Another recent speaker was Bill MacCallum who talked last fall to the New York branch of the National Association for Industry-Education Cooperation. (You will remember he is N.A.I.E.C. president.) His subject: "Communications—the Key to our Civilization." Seems the Association has a theme for the year, "The Communication Gap in Industry-Education Relations." As one of the country's foremost telephone users,

Bill knows his communications at first hand. He leaves no gap undialed. . . . In mid-January **Pret Littlefield** was due for his fourth detached retina operation to be done at Boston's Eye and Ear Infirmary. Let's hope this is the one that does the trick. . . . A Christmas card from Brazil is signed Hanne e **Adolph Santos, Jr.** Last we knew Dolph was the gay bachelor of Sao Paulo—granted, that was years ago. There was a note that they hope to pay us a visit one day. Trust that materializes.

The **Phil Bates's** have retired to Santa Monica, Calif., but so far they seem to be using it more as a base of operations than anything else. Let Phil (or more probably, Jocky), tell it. "We have had three leisurely and lovely trips by auto—to Florida and North Carolina in April, New England in July, and through the Rockies to Chicago in the fall. These trips were through many countrysides and canyons and over mountains we'd previously only seen from a plane. The dogwood in North Carolina, the varied blues of water on the way to Key West, bluebonnets in Texas, in Colorado the round trip by narrow gauge train from Durango to Silverton, the petrified forest in Arizona and climbing through the cliff dwellings at Mesa Verde were all bonuses. We thought we'd have time for gardening, but we've been away too much. We'd wondered what we might do without an eight to five commitment, but that hasn't been a problem. Breakfasts, however, are late and leisurely." And Phil, of course, now has time to really savor his breakfast coffee, liberally laced with Carnation milk. Can't break the old ties entirely just because one has changed from producer to consumer.

Among the Bates's fellow townsfolk are General and Mrs. **James Doolittle**. In early December the Air Force Association (which Jimmie founded back in the '40's) threw a big (400 guest) party for the Doolittles to celebrate their 50th wedding anniversary. They were presented with, among other things, a book of congratulatory letters from a lot of people including Presidents Johnson, Eisenhower, and Truman. . . . The **Cardinal's** annual letter records many family events of the year. Leading the list is the fact that the last of their eight children has finished college. Those of you who struggled through two or three college educations ponder on that! Now the most exciting thing Lorene and Paul have to do is sit back and count their steadily increasing flock of grandchildren and, of course, hop around the country to take a look at them. The score is 19 at the moment, or rather as this is written. By the time you read these notes that figure will no doubt be obsolete.

Sorry to bring this to a close by reporting two deaths that occurred in December. **Sarkis M. Zartarian** was one, just four days before Christmas. Sark was a lawyer, industrialist, General

and one of the leaders of Boston's Armenian community. He and Rose were with us at Oyster Harbors for our 35th. If you were there you probably remember when **Clint Conway** and Paul Cardinal couldn't get their mini-missile to blast off. Sark took over and made a successful launch. As surprised as anyone, he said, "Well I'll be damned, I guess I really am qualified to have a missile command!" . . . The second was **William V. Cash**, a retired professor of architecture, who died in Washington, D.C. We have no further information. . . . When these notes appear February will be at an end. Don't know what this spring will be like, but we have had redwings and spring peepers here by mid-March. In any event, winter will be on the way out, and soon it will be possible to get out and try to locate and plug all those cracks today's frigid winds have discovered. Except that by the time it's warm enough to do that sort of chore it won't be needed. Another winter will be a long way off. Why hurry things? That's retirement.—**Henry B. Kane**, Secretary, Lincoln Road, Lincoln Center, Mass. 01773

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The brief notes from classmates which reach your Secretary via the Alumni Fund Office are much appreciated, and I am sure other classmates enjoy learning about what the 1925'ers are up to. . . . A note from **Victor Allen's** wife indicates that, as of the middle of December, Victor was quite ill. He and his wife had taken a trip around the world beginning on October 8, 1966, and ending on July 13, 1967. . . .

Russell Grove notes that after completing Tech and having an extended stay in South America, he settled in Atlanta, Ga., doing mapping and construction. While there he obtained his law degree with honors from Emory University, and since 1935 has been a practicing attorney in Marietta, Ga., specializing in taxes and estates. His son attended the University of Melbourne Law School in Australia and while there visited with **Frank Broadhurst** at his home in Melbourne. . . . **Fred Greer** is still President of Wire Belt Company of America in Winchester, Mass., but his son (M.I.T. '52) is now with him and doing such a good job that Fred hopes to turn everything over to him shortly.

Winthrop Humphrey, from whom we have heard little for a number of years, notes that he is running a small but fairly well known fun business—a combination mail-order, retail and manufacturing operation called the Old Guilford Forge, Inc., in Guilford, Conn., dealing in all kinds of early American reproductions. He said he probably ought to retire but does not want to as yet. . . . A note from **William Gordon, Jr.**, indicates that he retired from the U. S. Rubber Company, Central Engineering Department in New York

City on December 31, 1966. . . . **Charles Cooper** continues to serve as an M.I.T. Educational Councillor for the area around Northfield, Mass., interviewing up to a dozen would-be M.I.T. freshmen each year. This, combined with some consulting and maintenance work about his home, keeps him adequately busy. He notes further that the latch strings is always out. . . . An interesting address change from **Finlay Cameron** indicates that he is with U.S.A.I.D. in Vietnam. . . . It should be noted that **Don Taber** has been elected to the Board of Directors of the Associated Industries of Massachusetts.

The Boston *Herald-Traveler*, on the morning of Thursday, December 28, 1967, carried a picture of smiling **Arthur J. Olson**. Arthur, who resides in Milton, Mass., was headed for the New England Telephone Company's Engineering Headquarters in Framingham on a bus chartered by 40 commuting Telephone Company employees. This particular trip was noteworthy, for on this December 27 he was to retire after 42 years of service to the company. When he boarded the bus in Milton at 7:45 a.m. his fellow commuters greeted him with a surprise retirement party, and he noted this was the first retirement party he had ever attended en route to work and he never expected it. Arthur is a native of Quincy, Mass., and he joined the Telephone Company upon graduation from M.I.T. He began as a project engineer in Providence and has worked on assignments in Maine, Massachusetts and Rhode Island. As a reminder of his commuting days, a lifetime pass to ride this special chartered bus was presented to Olson by his many friends in the Telephone Company. . . . A note from **Myron Doucette** and a copy of a pamphlet entitled *Machine Tool Laboratory Notes*, by R. H. Smith of M.I.T., copyrighted in 1888, came a few days after the New Year. Myron appears to be having a most challenging and satisfying job in assisting in the establishment of the university at Stony Brook N. Y. They are well into the second phase of construction with 30-odd buildings in some stage of completion. He notes that they have about 5,100 students at the present time and are hard pressed for space of all types, as construction and obtaining estimates of completion do not exactly match.

The **Irving M. Symonds'** letter was certainly appreciated since it was realized that they were directly in the path of Hurricane Beulah in their retirement home at Brownsville, Texas. Although their house was undamaged by the hurricane, they had a great deal of heavy work on tree pruning, sawing, stump removing, putting in guy wires and all to help save some of the trees on their property. Fortunately, they were able to get some help with the heavy work. Everything now looks very nice, but their huge old trees were, of course, irreplaceable. Some 10 palms, though tattered, are upright

and lovely. They were leaving on a trip to Panama, Trinidad, Jamaica, and the lesser islands. Although retired, Sy continues doing a great deal of consulting work and, when he has time, is turning into quite a gardener. In connection with his consulting work this past year he visited England and Germany, after which he and his wife went on to Turkey, Greece and Rome. . . . A Christmas greeting from **George Basil Blonsky** indicates that he is still headquartered in New York City and like so many of us is most unhappy about the present world conditions. . . . It should be noted also that Christmas greetings came from our good friend and loyal classmate, **Kamy Kametani** in Tokyo.—**F. L. Foster**, Secretary, Room E19-702, M.I.T., Cambridge, Mass. 02139

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The *Review* office has always been very meticulous about checking the spelling of every name mentioned in the Notes. Last month, we used a news item that a classmate sent in on an Alumni Fund form but the Class Notes Editor Pamela Shea couldn't find the classmate's name anywhere so she bounced it back at me. While a class secretary is supposed to know everyone, sometimes it's just the name that is familiar and while this name rang a bell, I couldn't find it anywhere either. If you are getting curious, the name was Delvaille and since he mentioned **Bob Chidsey**, I finally wrote Bob who unravelled the mystery. In reading the note, I missed a hyphen and while I scanned the Alumni Register for every graduate under the D's, I should have been looking under the C's. With all this preamble why don't we read the note from **Gilbert Caro-Delvaille**. "I retire in June, 1968! The last 38 years were spent with California Electric Power Company, a utility serving Southeastern California, until, in 1965, California Electric was merged into Southern California Edison Company. P. S. What happened to Canals and Chidsey?" (The M.I.T. Alumni Register lists **C. S. Canals** as being with the Frederick Snare Corporation, 233 Broadway, New York City. **Robert S. Chidsey** is listed as being Town Engineer, Box 487, Simsbury, Conn.) Now let's see what Bob Chidsey said in his reply. "Dear

George, Yes, I remember my good friend Gilbert Caro-Delvaille quite well. I am surprised to hear that he is retiring; I supposed these old engineers just kept going on and on. Nothing new and startling with me. I do some consulting work, enough to keep me busy. I always enjoy your news letters. With best wishes, Bob Chidsey."

In her letter, Miss Shea admitted reading the '26 notes and even commented: "Pigeon Cove Sounds idyllic." Didn't realize we had been doing such a good job for the Chamber of Commerce, but before we oversell the place let's tell you about the last couple of days. Sunday dumped the second foot of snow upon us, and as it cleared the temperature dropped to below zero and the north wind whipped up to 40 knots. The plow came at noon but Old Boreas drifted it right back again. We keep some heat on in the "Focastle" where Tom Pitre stays in the summer, but I never trust mechanical gadgets (I hope **Stark Draper** isn't listening—his Apollo gadgets work so well), so I have to go over at least once a day to check and each time the snow is up to my armpits notwithstanding the constant use of an electric snow shovel. The gulls come right to the door for their bread crusts—not two gulls, but 20. Each morning the relatively warm ocean boils, producing what the local folk call Arctic mist. It's really picturesque—mountain high on the horizon and from 20 to 60 feet nearer shore, behaving much like clouds—wind-blown and spouting here and there.

But we are running out of time so here are a couple of address changes from classmates who don't seem to go for this idyllic New England climate. New addresses are **Killian V. R. Lansingh**, Herrera y Cairo 2572, Guadalajara, Jalisco, Mexico; also, **Albert F. Kinzey**, N. Franklin Street, Cloverdale, Calif. 95425. . . . A Christmas card from **Martin Staley** doesn't indicate that he is shovelling snow in Texas either. However, **George Makaroff's** card depicts him on skis at the top of a mountain with the comment: "Dear George, Now that the boys are getting older and health conscious, how about joining the Fresh Air Club of New York, one of the oldest in U.S.A. and for men only? Initiations are at Tombstone, Rockland County, with vodka on the club. (Don't let the name scare you.) Best regards, George." . . . It's 10 before 10 and I have a clock that shuts the post lamps off at 10 so Heather and I must take a short walk. She doesn't go for the snow and cold as did our St. Bernard. (P. S. The "Focastle" pipe did freeze.) So Cheerio until April.—**George W. Smith**, Pigeon Cove, Mass.

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A memorial service for **Harold Hewes Staebner** was held in Basking Ridge, N. J., on December 3. Harold came to M.I.T. his freshman year from Boston

and graduated in electrochemical engineering. In his junior and senior years he was a member of the wrestling team. After graduation he went directly to the Bell Laboratories in New York City and also became a licensed professional engineer in the state of New York. He was elected a Member of the Telephone Pioneers and, in 1962, retired from Bell Laboratories due to disability. Harold's widow, Mrs. Agnes J. Staebner, writes me that his three grandsons are definite prospects for M.I.T. . . . **John P. Campbell** died June 1, 1967. He had retired from the American Blower Company and lived in Chicago. He graduated in Course XV. . . . **Sydney D. Berman**, who lived in Rialto, Calif., and was an employee of the Air Force with a rank equivalent to major general, died February, 4, 1967. He had been the recipient of two meritorious civilian awards and, in 1965, was presented the Air Force's highest civilian honor, the Exceptional Civilian Service Award, based on his performance as Technical Advisor in the Pentagon-level Directorate of Aerospace Safety. His contributions were cited as being of "inestimable value to the combat potential of the United States." Syd had previously been chief of the technical division of the Bureau of Safety of the Civil Aeronautics Board. He entered Tech from Malden High School and graduated in Course IX-B. . . . **William D. Wolfe** died July 17, 1967. He had retired 10 years before as a research chemist with the Goodyear Tire and Rubber Company. His home had been in Cayuhoga Falls, Ohio. . . . Our condolences go to two of our classmates who have had recent losses: **Jack Eldert's** wife, Evelyn, died in May of last year, and **Dave Truax's** daughter in December.

After 40½ years with General Electric, **Dick Cutts** has retired to 21 Lombardi Lane, West Warwick, R. I. 02893, where he and his wife have setup shop as travel consultants. He writes: "Our primary forte is planning and arranging top executive industrial meetings—specializing in resort-type locations. We are Eastern Representative for Hotel Cabo San Lucas, at the tip of Baja California, Mexico; and are New England representative for Lost Tree Club in North Plam Beach." This fits in well with Dick's last assignment at G.E. as manager of special customer meetings. . . . **Harvey Fitts** is now President of Clark-Wilcox Company in Boston. It is a long-established construction equipment company. *New England Construction* magazine recently carried an article about Harvey's twin sons who are in their father's business and have, at the same time, made outstanding records in stock outboard racing. Both were named national high point champions last year, Stan in 35 h.p., Steve in 40 h.p. . . . **Bill Taggart** has been honored by the Quarter Century Club of Dewey and Almy Chemical division of W. R. Grace and Company for completing 40 years of service with the organization, of which he is

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now President. . . . A guest speaker at a meeting of the Architectural Society of Ohio was Samuel E. Homsey, '26, representing the American Institute of Architecture of which he was a vice-president in 1966-67. His designs include the American embassy in Teheran, Iran, the Delaware Art Center, and the Winterthur Garden Tours Pavilion. He is a painter of note and his work hangs in the Boston Museum of Fine Arts.

Russ Westerhoff, Chairman of Ford, Bacon and Davis, Inc., was a speaker at the fifth annual Conference of Professional Engineers in Industry (P.E.I.). . . . **Edward Durell Stone** brought good news to the Marble Institute of America when he told them that there wouldn't be any more "dark glass boxes." He said: "I never was caught in that glass box trap, which I found very unsightly, very temporary in appearance, and very impractical." Speaking of his General Motors Building, now rising in Manhattan, he added: "I hope this building will start off a new trend toward buildings that look more permanent and have a light color." Other of his current projects include the New York City Civic Center, International Trade Mart in New Orleans, New York State University Center in Albany, Rhode Island State Office Building complex and master plan in Providence. . . . We were happy to receive the announcement of **Charlie Smith's** marriage to Eleanor Barnes Richmond in Newtonville at the end of December. . . . **Schuyler Kleinhans** has been elected Fellow of the American Institute of Aeronautics and Astronautics. Kleinhans went with Douglas Aircraft in 1933 as a project engineer, became chief engineer in 1958, receiving major responsibility for the Douglas DC four, six and seven projects. In 1960 he was appointed corporate director of advanced research and in 1965 made vice-president of engineering and research. Recently he has retired and is consultant to the company, which is now a component of the McDonnell Douglas Corporation. . . . After completing their tour of the globe, **Glenn Jackson** and **Betty** are back home. . . . **Clara Ellis Smyth** has retired and is living in Pocasset. . . . **George M. Cunningham** and his wife have completed a 35,000 mile round-the-world tour via the P. and O. Line, train and bus, and are back in Los Angeles.

William C. Erwin retired last June from the M.I.T. Lincoln Laboratory and hopes to see some of his old friends at his home on North Road, Carlisle, Mass. His interests in retirement include astronomy (of course), music and boating. . . . Lake Belton, Texas, is the site of **Jesse Nash's** retirement home. With an Airstream travel trailer, he and his wife also spend part of the year in Mexico, Florida and the north. . . . A note from **Grenville Gerrish** says: "Retired as President of Wolverine Corporation and sold out my interest in 1960. Since then have been a design

consultant on dryers, ovens, freezers and other air handling equipment for Diamond International Corporation and Greer Division of Joy Manufacturing Company. My wife and I have been catching up on travel and sightseeing, most recently South America on the *Argentina*. The Gerrishes live in Melrose. . . . Retired Col. **Bob Connor** is now President of the Alumni Association of the University of Bridgeport, Conn.

After 40 years with A.T. and T. Long Line Department, **Ernie Dodge** has retired to "an old country house in Dutchess County." He and his wife planned to redecorate the old house at their leisure, but their daughter decided to be married, advancing their timetable quite a bit. . . . In asking for information for the 40th Reunion, we referred to the class baby as the last baby to be born to a member of the class. **Bill Kaplan** has rightly pointed out that since graduation the term has previously applied to the first baby born to a member of the class. Bill says: "If so, can any of the members beat my daughter, Jeanne, born March 23, 1928? Jeanne is now married to Dave Gross, Air Force Captain, has a 13-year old son, lives in Bedford." Any takers? . . . We were sorry to learn that **Frank Connolly's** wife, Isabelle, is ill in South Laguna (Calif.) Hospital; we hope she is better now. . . . **Harry Moser** says that with two daughters in college in Boston, he is resuming his ties with the town; this would be between trips abroad where his G.E. patent work takes him with regularity. . . . **Carl Redd** is President of Baltimore Building Congress and Exchange for 1968. . . . **Bob Wallace** "found retirement not to my entire liking." So he is back in the truck business with Brockway Division of Mack Trucks, Inc., at Courtland, N.Y. He was with White Motor Corporation before his short retirement. . . . After spells of retirement in California and Texas, **Thornie Thorne** has returned to Rochester, N.Y., and he has built a house and says that this is the end of his moving!—**Joseph S. Harris**, Secretary, Box 654, Masons Island, Mystic, Conn. 06355

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40th Reunion: McCormick Hall, M.I.T. Campus; June 7-10, 1968; for reservations: Abraham Woolf, 15 Court Square, Boston, Mass., or Mrs. Ralph T. Jope, 37 Dix Street, Winchester, Mass.

A note from **Ed Poitras** tells us, among other things, that as of January 4 he had received 180 registration forms for our June Reunion. They arrived two or three a day, and the number indicates that our 40th should be tremendous. If you haven't yet registered or if you haven't returned your questionnaire for the class book, please do so. . . . Of particular interest to Course I members, we quote the following clipping from Washington, D.C., dated September: "**Edward H. Holmes** was sworn in recently as Director of Policy Planning in the Department of Transportation's

Federal Highway Administration. The ceremony was conducted in the office of Federal Highway Administrator Lowell K. Bridwell. Mr. Holmes had been acting in the capacity of Director of Policy Planning since the establishment of the Federal Highway Administration in April of this year. Before that, he served six years as director of planning and six years as director of research in the Bureau of Public Roads. He joined the Bureau of Public Roads in 1928 after his graduation from M.I.T. The Office of Policy Planning identifies and analyzes long-range goals and policies for the Federal Highway Administration programs. It works closely with the Bureau of Public Roads, the National Highway Safety Bureau and the Bureau of Motor Carrier Safety on behalf of the Federal Highway Administrator. In his almost 40 years of government service, Mr. Holmes has received numerous awards for outstanding accomplishment including the Department of Commerce's Meritorious Service Award, its Gold Medal for Exceptional Service, and the Highway Research Board's Roy W. Crum Award for Distinguished Service. A native of Kingston, Mass., Mr. Holmes is a member of the Institute of Traffic Engineers, and has served on many committees of the American Association of State Highway Officials, the Highway Research Board and other national and international organizations.

A note from **Myron Helme** states: "I see so many familiar names on the back of your letterhead I figured it was about time to join the crowd. I sure look forward to seeing you all on June 7. I'm finishing my career at the U.S. Army Electronics Command at Fort Monmouth but still have four long years to go. I have one daughter, a graduate of Bucknell University, who now works as a biologist-toxicologist with Schering Pharmaceutical. Best wishes for the holidays and fair weather and full steins." . . . **Alfred Knight** was appointed judge of probate for Barnstable County, Mass., early in 1967. . . . And from **Alexander D. Fowler**, "I retired in June of 1966 from Bell Telephone Laboratories, and I'm happily pursuing my hobby of local history. I am active in several historical societies and spend considerable time in lecturing, teaching and researching in the field of local history research." . . . **James R. Rae**, Course VI, was recently elevated to grade the of Fellow in I.E.E.E. "for contributions to the improvement and expansion of worldwide communication services." . . . From **Jim Donovan**: "I had a very pleasant telephone call from **John Campobasso** from your home town of Lexington. Some things are breaking nicely for John now; he's working for himself as an independent manufacturer's representative—some of his life-time effort will be rewarded by one of these romantic successful mergers. His wife is feeling better, and his son is really enjoying living in New Hampshire and teaching. John is going to work with us some on the Reunion and is looking forward to seeing the old Course I gang this June."

The following news release was recently received from the U.S. Air Force, and once more we salute a former classmate for honors well deserved: "The Air Force Systems Command Certificate of Merit has been awarded to an Air Force Contractor. Col. John B. Shipp, Deputy Director of the Air Force Materials Laboratory at Wright-Patterson Air Force Base, presented the award to **Merrill R. Fenske** at a Hydraulic Fluids Conference banquet where Dr. Fenske was guest speaker. The conference, held at Dayton, Ohio, was sponsored by A.F.M.L.'s Non-metallic Materials Division, Fluids and Lubricants Branch. Professor and head of the Chemical Engineering Department and Director of the Petroleum Refining Laboratory at Pennsylvania State University, Dr. Fenske's outstanding contributions in fluid and lubricant technology have solved many vital Air Force materials problems. 'During the past quarter of a century he has provided breakthroughs of major importance to Air Force aerospace vehicles and their supporting equipment,' stated the citation. The certificate and citation were signed by Gen. James Ferguson, Commander of A.F.S.C. A graduate of DePauw University, Dr. Fenske received his doctor of science degree in chemical engineering from Massachusetts Institute of Technology. At Pennsylvania State University since 1929, Dr. Fenske directs the Petroleum Refining Laboratory, established to assist the refiners and marketers of Pennsylvania oil to meet the automotive, industrial and military requirements for petroleum products. In 1964 Dr. Fenske was presented the Redwood Medal, the highest award of the Institute of Petroleum, for his contributions over many years to the world-wide petroleum industry."

Recently **Jim Donovan** sent us the messages he received on about 50 Christmas and New Year cards. Many of these messages probably will be included in a publicity piece that **Charlie Worthen** will send out before these notes, written on January 10, will reach you in the March issue of the *Technology Review*. Incidentally, Charlie and Velma at this point are in California on a six-week vacation visiting their daughter. Fortunately for them they missed this zero, zero weather and deep snow that we have been suffering with in New England. —**Hermon S. Swartz**, Construction Publishing Company, Inc., 27 Muzzey Street, Lexington, Mass. 02173

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Word of the death of **Fisher Hills** will sadden the hearts of all the classmates who knew him, I am sure. Fish was certainly a most loyal member of our class, having participated in many of the alumni activities and serving as Class Secretary for many years. We received the following notice: "In Newton, December 26, Fisher Hills of 137 Maple Street, Needham, husband of Margaret (Stranahan) Hills, father of Frederic A. of Norwell, Barbara Stuart of Charlotte, N.C.,

and Fisher Hills, Jr., of Framingham and Carolyn Reynolds of Lexington. Funeral services private. In lieu of flowers contributions may be made in his name to the M.I.T. Alumni Fund." We extend our heartfelt sympathy to Peggy and the family.

A Christmas greeting from **Ross Pfalzgraff** brought news that Ross is still travelling extensively performing his management consulting duties. . . . A news release from the American Statistical Association of Washington, D.C., lists Major General **Leslie E. Simon** (Retired) of Winter Park, Fla., as a member of the Wilks Award Committee. "The Wilks Award is given each year to a statistician and is based primarily on his contributions to the advancement of scientific or technical knowledge in Army statistics, ingenious application of such knowledge, or successful activity in the fostering of cooperative scientific matters, which coincidentally benefit the Army, the department of Defense and the Government." . . . **Edward Partington** had sent word that he is retired from Nortronics, Northrop and has moved to a mobile home in Palm Springs for health reasons. He says the park is well equipped and their home is on a hill with a view of all the south end of Palm Springs. . . . **Mrs. John Parker** wrote that she spends eight months of the year at Ipswich, Mass.—has a granddaughter near Dijon, France, whom she visited, and is interested in gardens, planting, and conservation. With best regards,—**John P. Rich**, Secretary, P.O. Box 503, Nashua, N.H. 03060.

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You may recall that in the November issue I reported that the distinction of having the youngest child had passed from **Yicka Herbert** to **Morris Shaffer**, and asked whether there were any challengers. This query has elicited responses from two more contenders. **Saul Siegel's** claim is predicated on his fifth child and third son Richard, born on April 13, 1963. According to my records there is a 24-year age spread among the Siegel siblings. For a brief period I was inclined to acquiesce in Saul's allegation that he is entitled to "permanent possession of the prize," but it now appears that the most recent contender has a superior claim. **Ed Harr's** fourth child and second daughter Mary Lee was born in 1966, and thus at time of writing is short of two years old. Moreover, to substantiate his claim Ed supplied photographic evidence that appears elsewhere on this page. Due to her tender years, Mary Lee has a chronologically unusual set of relatives. Thus she has a 39 year old brother Edward, Jr., who is an engineering physicist with General Dynamics, and five older nephews and nieces, who are doubtless delighted to baby-sit with their youthful aunt. . . . **Bob McCarron** has been made Sales Manager of Morningstar paper products for A. E. Staley Manufacturing Company of Decatur, Ill. The news re-

lease suggests that Staley acquired Morningstar products from International Latex for whom Bob formerly worked. . . . **Joseph Westell** has been retained by the Rhode Island Department of Public Works as a highway consultant. He was formerly head of the U.S. Bureau of Public Roads in Rhode Island.

Ormond Lissak is with the Department of Public Works of the City of Mountain View, Calif. . . . **John Lovejoy** is President of Lovejoy Construction Company in Des Moines. His older son David graduated from Iowa State with a degree in Building Construction. Younger son Roger attends the University of Iowa. . . . **Henry Pattison** is semi-retired and spends most of his time at his home in Tucson, Ariz., but gets to New York on business from time to time. . . . **Sig Linderoth** is Professor of Mechanical Engineering and Research Coordinator (Sponsored Research) at Duke University, teaching freshman design and continuing with his consulting work in Machine Design. His consulting work has taken him to Europe several times. The Linderoth's older daughter Janet received a B.A. from Middleburg, an M.S. from Purdue and is now on the staff of the School of Veterinary Medicine at University of Kansas while her husband, an Air Force Lieutenant, works for his M.S. in E.E. Younger daughter Marilyn is working on an M.A. in music at Colorado University, majoring in piano and harpsichord. Sig, together with his Duke University colleagues in the Life Sciences and the Medical Research Center, have become involved in Ocean Engineering. They have a "fine Marine Lab at Beaufort, N.C., and one at Wrightsville Beach, N.C., where I have been working on research hardware for deep ocean (below 15,000 feet) use." Sig is also active in A.S.M.E. as a member of the Executive Committee of the Design Engineering Division and chairman of its Long Range Program Planning Committee. On the home front he has recently constructed "two hi-fi cabinets and a



Edward A. Harrs, '30, and his youngest child Mary Lee Harrs who expects to graduate with the M.I.T. Class of 1990.



Robert D. McCarron, '30

built-in marble-top china cabinet and counter in our dining room." Sounds like a fairly full schedule, Sig. . . . Changes of address: **Wilfred P. Eaton**, 525 Central Road, Rye N.H. 03870; **Lawrence N. Gonzalez**, 7116 Exfair Road, Bethesda, Md. 20014; **Wayne S. Hertzka**, 25 Main Street, San Francisco, Calif. 94105; **Dr. Henrik M. C. Luykx**, P.O. Box 486, St. Michaels, Md. 21663.—**Gordon K. Lister**, Secretary, 530 Fifth Avenue, New York, N.Y. 10036

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A thoughtful note from Stead Wright, '34, enclosed a copy of an article by **Jack Lane** entitled "N.L.G.I. Surveys Lubricant Output" which appeared in the September 1967, issue of *Hydrocarbon Processing*. Jack is Manager of the product and application information section, Research Department, Mobil Oil Corporation, and was presented N.L.G.I.'s highest honor in 1964. When I had lunch with him a few months ago, Jack never mentioned the article. . . . Word has just been received that **Chuck Starr** spoke at the Fifth Annual National Conference of Professional Engineers in Industry (P.E.I.) on October 12 and 13. . . . **Claude Machen** has been elected Director and Assistant Treasurer of Associated Industries of Massachusetts, and **Don Sinclair** has also been elected as a Director. (Our class is well represented.) A Dow news release tells of **Sam Waldman's** appointment as Technical Expert in The Dow Chemical Company's Process Engineering Department of Midland Division Research. . . . According to a recent announcement, **Gil Roddy's** company, Boston Manufacturers Mutual Insurance Company, plans to combine—when you read this it should be a fait accompli—with Arkwright Mutual Insurance Company of Boston. Gil will be President and the home office will be in Waltham where Boston Manufacturers has had its executive office since 1955.

George Humphreys reports that he retired as a Captain from the U.S. Navy in 1963 after 21 years of service. He is now Assistant to the President of the Benrus

Watch Company in New York and has just completed a special assignment to supervise the construction of a new 200,000 square foot plant for the Company in Ridgefield, Conn. George is looking forward to living in Connecticut, one of the nicest states in the Union. . . . Fate has a way of turning things around, says **Henri Turner**. Henri went to work in the Massachusetts State Highway Department in 1931 as a design engineer, then changed over to the Accounting Department in 1942, where he became Assistant Supervisor before leaving in 1964 to become Senior Administrative Analyst in the Methods, Systems and Procedures Section, which is compiling the first complete manual that the Department has ever had. . . . A copy of the *United News*, published in Mandaluyong, Rizal (Philippines), just received from **Wally Tibbetts**, tells of his appointment by United Laboratories as a Consultant in the packaging development of the company's entire product line. Wally retired from Union Carbide last June, and went to the Philippines last Fall on a special assignment. . . . Plans are now underway for the 40th Reunion, and **Bill Jacobs** has been appointed Chairman of the 40th Reunion Gift Committee. More on this later, meanwhile let all of us get in back of Bill.—**Edwin S. Worden**, Secretary, 35 Minute Man Hill, Westport, Conn. 06880

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Alvin B. Newton, Course II, 136 Shelbourne Drive, York, Pa., writes: "I am still Vice President and Director of Research for the York Division of Borg-Warner Corporation but have taken on expanded duties in the company's international areas. For the second time in four years I went on an extended tour of our associates in Western Europe during September. Otherwise I continue expanding the innovation theme here, and now have received nearly 200 patents myself." . . . **Halsted R. Warrick**, Course X, 39 Ross Court, Putney Hill, London S.W. 15, England, writes that he has transferred from the position of Manager of Process Engineering for Caltex Services Ltd., to the position of Coordinator of Air and Water Conservation-Europe for Texaco Services. . . . **Herman G. Protze, Jr.**, Course IV-A, 41 Martin Road, Wellesley, Mass., is engaged in field and laboratory work in Materials Technology, specializing in research and development field control on concrete and constituents. He writes: "Our new building with increased laboratory facilities was completed in Newton Highlands in 1963. Our most recent jobs have included the new Boston City Hall, State Street Bank and five new buildings at M.I.T.: Space Research, Computer Center, Eastgate Married Students Apartment, Advanced Engineering and the Refrigeration Plant." . . . **C. Malcolm Davis**, Course V, 6814 Pagewood, Houston, Texas, has been with Kin O'Trol, Inc., computer consultants, for four years as client representative. He writes that "the consulting

work with hybrid (Analog-Digital combination) computers has been most rewarding and that activities with five grandchildren have been keeping me fit."

George H. Smith, Course XV, 2659 Lancaster Drive, East Point, Ga., has been Secretary for Church Extension, Presbytery of Atlanta, Presbyterian Church, U.S., for the past six years. He earned the B.D. degree from Columbia Theological Seminary in 1949, and the doctor of divinity degree (honorary) was conferred by Presbyterian College, Clinton, S.C., in 1964. . . . **Franz W. Bang**, Course IV, 24 Newtonville Avenue, Newton, Mass., writes: "Our old competition between architects and engineers continues. As an architect, I now have a plumbing engineer as boss, thanks to the vicissitudes of government employment. I enjoyed the Reunion at the New Ocean House last June." . . . **Edmund F. McLaughlin**, Course IX-B, Croton Lake Road, Mount Kisco, N.Y., has been named Manager of Safety and Plant Protection in Mobil Oil Corporation's Security and Safety Department. He joined Mobil in 1935 as engineer at the Brooklyn refinery. From 1941 to 1946 he served in the Army as a submarine mine plant commander. He returned to Mobil in 1946 as mechanical engineer in New York City and became a staff engineer in 1959, an associate engineer in 1960, and is now a senior associate engineer. He is a member of the American Society of Mechanical Engineers. Ed is married to the former Eleanor Dunning and they have two sons and three daughters. Ed also came to the Reunion last June. . . . The Chamber of Commerce of the United States has reappointed **Albert G. H. Dietz**, Professor of Building Engineering at M.I.T., to the Construction Industry Committee. Albert has been lecturing before many groups including the Australian Architectural Students Association, the German Plastics Association and a mission in Japan on engineering education. . . . The following address changes may enable you to welcome to your neighborhood some newly arrived classmates: **Daniel H. Haskell**, Course XV, from Providence, R. I., to P.O. Box 525, Newark, N. J.; **Burleigh M. Hutchins**, Course XV, from Medford, Mass., to the Rust Engineering Company, 930 Fort Duquesne Boulevard, Pittsburgh, Pa.; **Henry Rockwood**, Course X, from Pittsburgh, Pa., to 50 Jackson Street, Apt. 210, Hempstead, N.Y.—**Elmwood W. Schafer**, Class Secretary, Room 13-2145, M.I.T., Cambridge, Mass. 02139

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35th Reunion; Chatham Bars Inn, Chatham; June 7-10, 1968; for reservations: James Turner, 233 North Main Street, Meadville, Pa.

Just imagine my great surprise and joy when I received my very first letter from **Ivor N. R. Morgan**, White Plains, N.Y. Ivor got a masters in Course XV. He was with, consecutively, Phelps Dodge,

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the Aluminum Company, Seaboard Machinery Company of New York City, four years in the Navy (ending up as a Lieutenant Commander), then nine years with Standard Brands, and is now with General Foods. With both Standard and General Foods Ivor worked mostly with the Frozen Food Divisions. Ivor's work is involved, as Division Process Engineer, in "heavy doses of cost estimating and economics, plus heavier ones in thermo." The solutions to these problems are had through aid from the shared-time computer, which I have learned to program after a fashion." In 1942, he married Laura Friend and they have five children. Laura, the eldest, is a secretary with Eastman Chemical in New York City; John is at R.P.I. taking a course which is comparable to Course 11-A at M.I.T., getting his industrial experience with the Materials Testing Lab at G.E. in Schenectady; Liz is in her second year at Cornell studying home economics, it seems she has a flair for design; Tommy is in junior high; and Jane is in the sixth grade. Ivor is involved in church work and is the Treasurer of the First Baptist Church of White Plains. He is getting ready to operate as a local collector for the M.I.T. Alumni Fund. Ivor asks for news of the following classmates: Ray Therriault, Bob Timbie, Joe Leto, and Frank MacDuff. I am sorry to say that Frank is deceased. Frank had a brother-in-law in the class. Will he please make himself known. . . . I have just a little to add to a short story sent in by **Len Julian**, several months ago regarding the Julians' visit to their son in Bangkok. (He was on leave from Vietnam.) The young man, Rodney, is now back as a civilian and has returned to college. Their eldest daughter is a physicist at Welles-

ley and Brandeis and is a science writer/editor for Addison Wesley in California. Their younger daughter is a part time junior at George Washington, and is working at National Geographic. Len and his wife are very definitely heading for Chatham Bars Inn, June 7-9, 1968.

I wish to start a train of thought in the minds of our classmates concerning the idea of frequent vacations, retirement as early as possible, and retirement plans made years in advance. There is nothing more pathetic than to find a man who has retired with no plan to substitute something for the work grind. This poor chap never lives too long after retirement. Vacations, long and frequent, may seem to be Utopia—not so! Vacations tend, we hope, to refresh and renew that old vigor. . . . **Prue and Horace MacKechnie** now have their third grandchild. Their daughter Joan is at the University of Virginia in the School of Nursing. She has joined a sorority, and is in charge of pledges. The Macs, especially Prue, are deep in community and church work and, in addition, Prue is taking a sewing course. Horace is still with the Department of Defense in the V.E. Division; the one which is supposed to study and reveal money saving devices and methods. The Macs evidently took the same trip that Leona and I did several years ago; the round-trip tour of the Great Smokies, and at just the right time when the rhododendrons and the azaleas were in bloom. This Fall they took a two-week vacation, first visiting Expo, then returning through Maine and New Hampshire and then back to Virginia. They enjoyed "The Yorks" on the southeastern Maine Coast and Cape Neddick, and were also able to visit the work of restoration of "Strawbery Banke," Portsmouth, N.H. The work is going on at a rapid pace and has been called a small Williamsburg.

Jack Andrews married Jermani Mueller in April. They took their first honeymoon in Williamsburg at a most lovely time of year, springtime. They came back for a few days to their home town, Princeton, found a house and then took off for Expo 67, then off to Blackstone Lake in Ontario, Muskoka Region. In September Jermain went back to teaching third grade at Miss Mason's School in Princeton, and Jack went back to work. Janie Mueller has returned to Wheelock, after a summer of work at Edgartown, Mass. Johnnie Mueller spent the summer in the potato fields of Idaho, handling irrigation pipe, and then returned to Princeton High. The Andrews sisters (of Jack Frost) all graduated in June: Gail from Mercer Hospital Nursing School in Trenton; Gwen from Katherine Gibbs in Boston, and Valerie from the Knox School, St. James, N. Y. The first two are living and working in Boston; Gail at the Massachusetts General and Gwen at the State House. Valerie entered Beaver College this past September. A most appropriate choice as daughter of a well rounded Beaver of many years.

I have a request to make of members of the old Musical Clubs Honorary Society, "Baton." Would you please look over these names and let me know if I have translated them rightly from the Baton Paddle? I am tracking down some of the talent of those long gone years. The names are: Shipley Case, Clifford or Clifton Furness, George Hazen, Bill LeLivre, Max Levy, John Morrill, Peter Sachs, William Cope. Incidentally, I wrote to some of these fellows.

When a fine M.I.T. feature was held in Orlando, Fla., on January 27, the M.I.T. Mid-Winter Festival, I suggested that classmates living in Florida attend this event. I had one immediate reply from **Prentiss Huddleston**. Prentiss is with a firm that he started himself, Huddleston, Satterfield, Evans, and Lillie, Architects and Engineers, of Tallahassee. He wrote a very nice and very cordial letter with a lot of information not previously available to us. He is quite active in his community, in the Chamber of Commerce, Kiwanis Club and the Committee of 100. We note that he also is a member of A. I. A. The Huddlestons have one married daughter and one son, who left for Vietnam last June. The folks went to San Francisco to see the young man off and enjoyed their trip to this wonderful city. Prentiss has one abiding combination hobby, boating and fishing, and he pursues both at Alligator Point on the Gulf Coast where the Huddlestons have a cottage.

Ellie and **Mal Mayer** (who is semi-retired) travelled through New Hampshire in their camp trailer. Mal gives no dates. They also spent a month in the Caribbean, and three weeks ago the Mayers went to South Africa. Unfortunately they were tied up with a British associate while in Capetown so could not take time out to visit with **Wolfie Kloenne**, now a resident of Capetown. Mal and Ellie soon will be on their way to California, probably via Chicago. One son is now with Abbott Laboratories and lives in Waukegan, Ill. In California the Mayers will visit Ellie's mother who lives in Carmel. Mamma is a very charming girl, and I know—she came to see me one time in Exeter. . . . **Louis Alpert** just returned to Chicago from a 16-day trip to Florida and was in Pompano Beach. The Alperns have been grandparents since a year ago. Their grandchild is a girl. Louis says that he attended only one reunion, the 25th, which he really enjoyed. He hopes that he will be able to attend the 35th. . . . **Ezra Ellis** replied in code, or what appears to be such. He is an Instructor at St. Petersburg Junior College and is a ham radio fan. Ezra's civic activities include an occasional lecture. . . . **Dick Payzant** of Merritt Island, Fla., will not be able to make the Festival but he has a good reason; he has been transferred to Huntsville, Ala.

We have word from one of our distinguished classmates, **Norman Levinson** former Professor of Mathematics at M.I.T. He has been made Head of the Department. Norm, please accept our

most sincere congratulations. Norm took his S.B. with us, his masters in 1934, and his doctors degree in 1935. He was Redfield Proctor Travelling Fellow at Cambridge University from 1934-1935, after which he spent two years as a National Research Council Fellow at Princeton and the Institute for Advanced Study. He then returned to M.I.T. as an Instructor in Mathematics; became an Assistant Professor in 1944, and Professor in 1949. He was Acting Head of the Department from 1951-52. Norm had a letter to the Editor published in the *New York Times*, November 19, 1967, entitled the "Soviet Space Program." Norm explains a little about how the Soviet Space Program came about in its present form, and how we (U.S.) happened to get into the act. I cannot quote due to lack of space, but it is fascinating. I intend to run the news slips through the Xerox, and make up a few dozen copies which will be available to those who might be interested.

Dick Morse makes the headlines again with his panel report on electrically powered vehicles. . . . **Robert G. Holt** of Montpelier, Vt., prepared at Phillips Exeter, took his S.B. with us and went directly to National Life Insurance Company of Vermont. He has now been made Associate Treasurer and Cashier. Bob and his lovely Margaret have two daughters, Elizabeth who is Mrs. Richard Stewart of Easthampton, Mass., and Barbara who is Mrs. George Randall of Rochester, Mich. We all wish you our very best, Bob. . . . **Dayt Clewell** represented the Institute at the Sesquicentennial Celebration of the New York Academy of Sciences held on December 6, 1967. . . . **Leon Hyzen**, San Clemente, Calif., travels extensively. He has become a rabid minor philatelist specializing in U. S. locals and carriers that have won awards in international stamp expositions. Leon says: "Would enjoy hearing from Course IV men."

Roger Congdon reports that as of January 1, 1968, we have 106 classmates who have stated that they will definitely attend the Reunion. About 80 of these will bring their wives. Gentlemen, this is quite a remarkable showing when analyzed this way; we have something over 800 in our entire class, 50 per cent of whom took bachelors degrees with us. About 9 per cent of our list is composed of those who took a bachelors elsewhere and came to take advanced degrees in 1933. That leaves 41 per cent. These are the fellows who elected to leave us before taking degrees. We have 50 per cent of 800 plus, which gives 400 plus. Twenty five per cent of these 400 have indicated that they will attend our 35th Reunion. **Fred Murphy** says that **LeBurton Webster** will be getting out a letter soon, and Fred asks you to reply very quickly. Please, fellows, give the committee a break because we want a top notch Reunion and this requires your cooperation. . . . We have a few address changes: Newton W. Buerger, XII; Frank S. Coyle, II; Robert Dillon, X; Richard

B. Hanley, XV; Col Michael Sampas, XVI; David B. Smith, VI; John R. Wiley, XVI; and Richard F. Zimpel, VI. Any and all of these address changes are available. Mark your calendar for the 35th if you have not already done so.—**Warren J. Henderson**, Secretary, Fort Rock Farm, Drawer H, Exeter, N. H. 03833 (until May); or 1079 Hillsboro Beach, Pompano Beach, Fla. 33062

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It has just been learned that **Sumner B. Sweetser** observed his 30th anniversary with the Esso Research and Engineering Company, Linden, N. J., last August 14. Although he received his bachelor's degree from Worcester Polytechnic Institute, Sumner earned his master's and doctor's with our class. He has worked with Esso primarily in process research and was named head of the Hydroforming Section in the former Process Research Division in 1955. In 1957 he became head of the Hydro-treating Section in the same division. Sumner spent a year with the Technical Information Division in 1959, and returned to the Process Research Division for a brief period in 1960. He has been with Technical Information since 1961. Sumner has 29 U.S. patents and has written four papers. Chairman of the Board of Adjustment of Cranford, N. J., he is also a member of the Cranford Republican Club and the Cranford Swimming Club. He and his wife Page have three daughters. . . . The American Institute of Chemical Engineers will conduct its first Materials Engineering and Sciences Exposition and Conference from March 31 through April 4, 1968, in Philadelphia at the Sheraton Hotel. Technical Program Chairman for the meeting is **C. S. Grove, Jr.**, Professor of Engineering at Syracuse University. Sherman received his master's degree in Chemical Engineering from Tech with our class. Various symposia chairmen for the meeting include C. M. Antoni, '37, E. Krokosky, '58, R. E. Cairns, '54, and A. H. Copper, '31. . . . **Nicholas G. Dumbros**, who received his master's degree in Geology with our class, has recently been elected to the newly established post of Vice President, Industry Affairs, at Marathon Oil Company, Findlay, Ohio. Nicholas was former Assistant to the President and Chief Economist.

A note from **C. Leslie Grahn**, who received his master's degree in Aeronautical Engineering with our class, states that he retired from civil service in the Department of the Navy on September 30, 1964. Better late than never with this news. Leslie lives on Cunningham Lane, Cherry Hill, N. J. "On November 15, 1967, a retirement dinner was held at Vallee's Steak House, Kittery, Maine for **Edward C. Taylor**, Nuclear Power Engineer, Portsmouth Naval Shipyard, Portsmouth, N. H., by his Naval Shipyard engineer and administrative associates." We have **Forrest F. Lange**, Secretary-Treasurer of '23, to

thank for this information and also for the following excellent biographical sketch of our classmate. "I was associated with Ed, as Regional Chairman of the M.I.T. Second Century Fund for the Seacoast Region, when he served M.I.T. as a Vice Chairman for this Region. I know of no man, engineer or citizen, who has enjoyed more respect from his associates than Ed. He was one of the Naval Shipyard's top responsible civilian authorities in his field of activity. The Navy has lost one of its most capable civilian engineers. Ed graduated from Brunswick High School, Greenwich, Conn., and attended Brown University from 1929-1931. While at M.I.T., 1931-1934, Ed was in an honor group and graduated with a B.S. and M.S. in Electrical Engineering. Prior to government employment, he served part time with an accountant, summers as an apprentice with the Panama Railroad Steamship Company, A.N.C.O.N.-State of Maine, and in a power plant in Cambridge, Mass. On January 25, 1935, he was appointed to a position at the New York Naval Shipyard. In 1940 Ed was promoted from junior material engineer to assistant electrical Engineer. In 1943 he studied electronics at Brooklyn Poly Tech. While at the Material Testing Laboratory, N.Y.N.S., Ed designed, developed and standardized the U. S. Navy's High Impact Shock Testing Machines still used by the U.S. Navy. He prepared extensive and concise reports of the behavior of these machines while under shock.

Ed was transferred to the Portsmouth Naval Shipyard as an electrical engineer on December 6, 1948. While at this shipyard, one of Ed's first achievements was the design, development and construction of the full scale pressure test tank for testing sections of full scale submarine models. This achievement enabled the U.S. Navy to study fatigue problems and strength problems of hulls and penetrations due to the effects of deep submergence pressure on such hulls. The test tank is still being used for this purpose, enhanced, however, by automatic cycling devices and recording instrumentation. Even prior to this, Ed designed and developed the Hydraulic Shock Machine at Portsmouth Naval Shipyard. The machine produces a shock wave which impinges itself on the item (penetration) while the item is under deep submergence pressure for the class of submarine concerned. This stimulates the shock wave produced by a depth charge at test depth. Ed presented a technical paper concerning this machine which was published in the D.O.D. Shock and Vibration Report. The paper was presented at the U.S. Navy Shock Symposium sponsored by the U.S. Navy Research Laboratory. During 1950, '51, '54, '55 and '57, Ed took appropriate courses in nuclear power matters. He received a Superior Accomplishment Award for his work performed in 1957. In addition to all this work and study, Ed is a two gallon and three pint blood donor. He has traveled to Canada, Iceland, England, France and

Spain. In 1966 he assumed the duties as Head of the Equipment Testing and Metrology Laboratory in the Shipyard, a position which he retained for about one year. The laboratory tests all types of equipments for compliance with Navy specifications in the fields of shock, vibration, impulse testing, environmental testing, pressure testing, photometric experiments and testing and calibration of electrical instrumentation. As Section Head of the Design Division Test Section he was responsible for technical guidance, coordination and preparation of Shipboard Test Memoranda for the testing of the U.S.S. *Tang* (SS563) Class. The *Tang* was the lead submarine for a new deep diving fast attack submarine. The test memoranda encompassed all systems (electrical, mechanical, and hydraulic), the successful completion of which proved the Navy's Detailed Specification. Ed then assumed a similar position in the nuclear power division as Head of the Test Branch in that division. Ed is the owner and captain of a fine sailboat; he has performed his civic duty on this subject by serving as a member and chairman of the Kittery, Maine Port Authority. On retirement in December, Ed and Winnie headed for Europe on a four to five month tour, beginning with Madeira, and including Spain, and one of their favorite sports, skiing in the Italian Alps."

Harold Thayer has been elected to the Board of Trustees of Washington University, St. Louis. Their Alumni News carried the following story: "Trained as a chemical engineer, Thayer joined Mallinckrodt in 1939. Twice during his association with the firm, from 1943-52 and again from 1955-58, he served as project manager of Mallinckrodt's Atomic Energy Commission plants. It was during the latter period that the company was commissioned by the Atomic Energy Commission to embark on the design and construction of a new uranium facility, ultimately located at Weldon Spring, Mo. During the intervening years of 1952-55, Thayer served as development director. His duties included the responsibility of organizing a product development department for Mallinckrodt's commercial products. In 1950 Thayer was appointed a vice president of Mallinckrodt, a post he held for nine years. He was made a member of the company's board of directors in 1955. From 1959-60, he was executive vice president of Mallinckrodt and became president in November 1960. Five years later, he took on the additional duties of chairman of the board. As an active participant in community affairs, Thayer is currently serving as General Campaign Chairman of the United Fund of Greater St. Louis. He is also a member of Civic Progress, Inc. He is a member of the Executive Board, St. Louis Area Boy Scouts of America; the Executive Committee, Metropolitan St. Louis Chamber of Commerce; and is a Director and Chairman of the advisory committee, Girl Scouts of Greater St. Louis. A native of

Rochester, N. Y., he holds an honorary degree of doctor of science from the St. Louis College of Pharmacy." . . . **Ed Chiswell** writes: "Have spent the last year on various assignments to Turkey, Arabia, Holland and England for my company, Standard of California. Am currently located with my wife and one of our daughters in London at least until September, 1968."

We are saddened to note the passing of **John Skinner** in September. He was 55. John was a pioneer in the development of the industrial hygiene profession, and chief of the industrial hygiene section of American Mutual Liability Insurance Company. He leaves his wife Rita (Fitzgerald) Skinner, and three children, Kathleen, David and Mary Ellen, all of Arlington. He authored many publications in the field of industrial hygiene, and was a past president of the New England section of the American Industrial Hygiene Association. John was a former director of the Division of Occupational Health, Department of Labor and Industries of the Commonwealth of Massachusetts. He was also a diplomat of the American Academy of Industrial Hygiene, a member of the American Academy of Science, and of the American Mutual Insurance Alliance Engineering Committee. . . . **Bob Jordan** was appointed to the post of Administrative Assistant at the Cooley Dickinson Hospital in Northampton, Mass. His previous responsibilities were in personnel management and head of planning and scheduling for the Pro Brush Division of the Vistron Corporation, Florence, Mass. During World War II Jordan was personnel officer for an Army Transportation Corps depot of 1400. He is a former president of the Northampton Community Chest and campaign chairman and has served on the board for seven years. He has also served as a member of the Common Council and is past president and director of the Northampton Council of Churches and past chairman of the boards of deacons and trustees and planning committee of Edwards Church. He is a life member of Appalachian Mountain Club and was a leader at one of its summer camps for several years. A native of Boston, he is married to the former Nellie David of Philadelphia. They have four children. Anne, a graduate of Mount Holyoke, is Mrs. Burton T. Fretz and lives in Philadelphia. Barbara, a Skidmore graduate, is a nurse in Rochester, N. Y. Susan is an art school student in Boston, and David is an undergraduate at M.I.T.

Wilbur Nordos recently addressed a church meeting in Westfield, Mass. The local paper carried the following story. "Wilbur R. Nordos of Albany, N.Y., employed by the New York Department of Education, will present the film *A Time for Burning*, and lead the discussion to follow. Produced by the Lutheran Film Commission, the film portrays the story of a Minneapolis church and its members as they come to grips with race relations and the effects on the

church and community. As administrator of the Department of Intercultural Affairs, Nordos is responsible for equal educational opportunities for students enrolled in the public schools and state colleges. Working in the field of human relations, Nordos works with school personnel and residents throughout the state in areas where problems of racial tensions and conflict may be lessened or avoided. Before his appointment with the New York Department of Education, Nordos served the New York City school system as teacher of mathematics, department chairman and principal." . . . **Arthur Miller's** daughter, Sona Lee, was recently married. She was a cum laude graduate of Pembroke College and her husband was graduated magna cum laude and Phi Beta Kappa at Brown and is now at Columbia Law School. . . . **Fred Vaughan** brings us up-to-date. He continues to own and manage his own company, Suffolk Converting, Inc., in the paperboard box and packaging field. He doubled his plant size in 1967 in Lindenhurst, Long Island. He also serves as Director of Hammond, Inc., Cartographers and Publishers.

Ed Sieminski remains with Grumman Aircraft, according to his recent note, in electronic areas of new business. He has only one son, but now boasts of three grandchildren and he claims, "it is almost like starting life over again." . . . **Winston Brown** tells us he has two through college now with three to go! One daughter graduated from the University of Wisconsin, '66, and is now in Washington, D. C., working for the Department of Defense. His boy, Winton E., graduated from the University of Wisconsin, '67, and is saving money by living at home while working for Eastman Kodak in Rochester, N. Y. . . . **Ralph Ranger** continues as Product Sales Manager for Sylvania at Exeter, N. H. His son Bruce is stationed in Anchorage, Alaska, and is with the Air Force. He has two daughters. Ralph's daughter Cynthia's husband is with the Raytheon Hawk Missile Field Support. They are living in Frankfort, Germany and also have two children. . . . **Irv Gahm**, who has been an M. D. for years in the Boston area, finished his training in psychiatry and is now a senior psychiatrist at Boston State Hospital. He also pilots his own plane and keeps active between cycling, squash and badminton. His oldest son is a neurosurgeon practicing in Hartford, and his youngest son is at Berkeley.—**W. Olmstead Wright**, Secretary, 1003 Howard Street, Wheaton, Ill. 60187; **Norman B. Krim**, Secretary, 15 Fox Lane, Newton, Mass. 02159; **James Eder**, Secretary, 1 Lockwood Road, Riverside, Conn. 06878; **George C. Bull**, Assistant Secretary, Mid-Atlantic, 4961 Allan Road, Washington, D. C. 20016

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Most of this month's news comes from comments that accompanied donations to the Alumni Fund, and the rest from

news clippings. . . . **John Tebbetts** writes that he is a real estate broker with Humphrey Associates in Needham and a securities salesman for Bishop-Wells of Boston. His daughter Jane is now a junior at U. Mass. in Amherst; daughter Nancy is a senior at Wellesley High. He wants to know where have all those years gone since the infamous lobster fight at the Senior Banquet at the Univesity Club. . . . **Spike Staff:** "Enjoying my retirement from State Health Department Laboratories. Travel a lot. Recently visited Scandinavia, England, and Nova Scotia, plus Expo '67. Served a month for State of Massachusetts as consultant in Medicare Laboratory Approval." . . . From **Vin Fopiano:** "During 1967, I became a member of Raytheon Company's Quarter Century Club (25 years service), more than three of which were spent at M.I.T. on a Raytheon project during World War II years." . . . **Murray I. Brown** reports that he is almost back in harness after an operation. . . . **J. W. Libby's** note includes the following: "We saw a lot of Nathalie and Thonet Dauphine and their boys this summer. We bought an auxiliary sloop together in May at Youngstown, N. Y., and spent the summer and early fall moving her, first to Stamford, Conn., and then to Georgetown, Md. One of my daughters, Anne, started work in Boston at Houghton Mifflin in August, lives on Commonwealth Avenue, and loves every minute of it."

From our other intrepid sailor, **Art Haskins**, this log: "Bought a new 27 foot cruising sailboat, a Bristol 27, and have done fairly well in cruising races, including the Monhegan-Manana Race (first last year and fourth this year). Spent most of this season prowling round in the fog without wind. As usual, cannot find time to do everything that needs to be done—either at Bath Iron Works or at home. Out straight in both areas." . . . **P. A. Guarino** is currently Associate Technical Director of the Army's Harry Diamond Laboratories in Washington, D. C. He is active in radar, missile guidance and ordnance electronics, particularly proximity fusing. Emphasis is on research and development, mostly on Army items, but some for other services and agencies. . . . **Boyd B. Brownell** is General Manager of the Electromotive Division of General Motors Corporation. . . . **Joseph Lempert** was elevated to the grade of Fellow by the I.E.E.E. for outstanding professional contributions, namely, for advances in the concept, design, and fabrication of x-ray tubes, imaging tubes, and electron beam welders. . . . **Alfred McDonald**, formerly an engineer for Bethlehem Steel at Fore River Shipyard, Quincy, has been appointed Assistant to the General Manager of Bethlehem's Sparrows Point Shipyard in Baltimore. . . . **George E. Fickett**, Vice President of American Design and Development Corporation of Whitman, was recently elected Vice President of the Smaller Business Association of New England. . . . **Max Wasserman**, who recently constructed a luxury apartment house

on Beacon Street in the Back Bay, put on a benefit for the Institute of Contemporary Art, using the public halls of the building to exhibit \$300,000 worth of art treasures. . . . In October, **Joseph L. Fisher**, President of Resources for the Future, presented a paper entitled "Toward a Maine Coastal Park and Recreation System" during a symposium at Bowdoin College. . . . **Walter Stockmayer** has been named Associate Editor of the newest American Chemical Society publication, *Macromolecules*. . . . **Richard E. Rice** is Vice President for Research at Comstock and Wescott, consulting engineers and scientists, in Cambridge, Mass.—**Phoenix N. Dangel**, Co-Secretary, 329 Park Street, West Roxbury, Mass. 02132; **Irving S. Banquer**, Co-Secretary, 20 Gordon Road, Waban, Mass. 02168

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My special thanks to **Ben Fogler** for writing last month's notes. He did such a good job maybe I should ask him more often. . . . I am sorry to report the death, on November 19 last, of **Michael Paskowski**. He was founder and President of the Danvers Foundry and Machine Company. Following service in the Navy in W.W. II and discharge as a Lieutenant Commander, he was associated with the Lynn Gas Company before starting his own company some 20 years ago. At the time of his death he was serving on the Board of Assessors in Salem. To his widow and son, Bruce, a student at the University of Pennsylvania, the class extends its sympathy. . . . Eastern Gas and Fuel Associates of Boston announce that **Michael Lach** has been promoted to Manager, Technical Analysis. He joined Eastern in 1948 after associations with American Cyanamid and the E. I. duPont Company. His concerns include air and water pollution and industrial hygiene. Mike lives in Quincy with his wife, Dorothy, and four children. . . . **Frank Berman**, staff consultant to Computer Applications, Inc., is one of three recipients of the Award for Meritorious Service pre-



Michael J. Lach, '36

sented by the New York Chapter of the State Society of Professional Engineers. The award was presented on December 2. Frank addressed the opening session of the Convention of the New Jersey Society of Architects last fall and predicted that computers will be used to help plan buildings in the future. His speech was part of a seminar of "Forecast '77."

Donald Kenny, Vice President of Rohm and Haas, delivered the Chemical Honor Society Lecture at Worcester Polytechnic Institute on "Social Responsibility of Industry." . . . **John Kleinhans** has been appointed Vice President of the Marion Division of the General Tire and Rubber Company, Marion, Ind. . . . **Ruth Humphrey Perkins** writes that she is Assistant Professor in the School of Education at the University of Connecticut teaching graduate and undergraduate courses in the teaching of elementary math and supervising student teachers. Ruth's address is 10 Maplewood Apts., Storrs, Conn. . . . **Martin Gilman** is retiring after 30 years with General Radio and hopes this will give him time to do things he has put off over the years. . . . **Randal Robertson**, a graduate member of the class and Associate Director of the National Science Foundation, spoke on science policy at a conference on Science for Clergymen at Oak Ridge last summer. . . . Your Secretary will be glad to hear from any of you at any time. Do keep the news coming!—**Alice H. Kimball**, Secretary, 20 Everett Avenue, Winchester, Mass. 08190

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Jim Newman is Executive Vice President of Booz, Allen and Hamilton, Inc., and is President of Booz, Allen and Hamilton International N. V. He is also a member of the Board of Directors of Booz, Allen and Hamilton, Inc., and a Trustee of the Phillips Exeter Academy. . . . **Bob Ferguson** is still with U.S. Steel and is Vice President of Engineering, Appropriations. He is interested in urban problems, especially "Action Housing," new housing for low to middle incomes; and the "Allegheny Housing Rehabilitation Corporation" (proposed) which is in the process of formation to buy, rehabilitate and sell low cost housing. Bob is also a Regional Chairman for the M.I.T. Alumni Fund in the Pittsburgh, Pa., North area. Other members of our class who act as Regional Chairmen for the Alumni Fund are **Curt Powell** for the Cambridge area and **Dan Hanlon, Jr.**, for the Neenah, Wis. area. Chairmen for Special Gifts Areas for the Alumni Fund are **George DeArment** for Erie, and **Phil Dreisslagacker** for New Haven. . . . **Rutherford Harris** writes that his daughter, Sally, was recently married and is presently living in Ankara, Turkey. His son, Ford, is a freshman at Arizona State. . . . **Eric Moorehead** has two grandchildren from his youngest child, with three out of four of his child-

ren now married. . . . **Dave Summerfield** informs us his older son, Steve, has completed four years in the Air Force (S.A.C.), and is now working and going to the University of Illinois (Physics). Younger son, Gary, graduated from the University of Tulsa in June, 1967, and is now a student in law school there.

Al Reinhardt is still with Hamilton Standard, Division of United Aircraft Corporation, and is involved with Environmental Control of the Boeing 747. His older daughter, Diane Drew, was graduated in 1967 from Vassar College, magna cum laude, and was awarded the Alice Snyder prize for excellence in English and a graduate scholarship at Stanford University. The younger daughter, Rochelle Maria age 9, is exhibiting a proclivity for horses and scientific observation. Al's wife, Claire, '38, continues as consultant in the Connecticut State Department of Health. . . . **Richard Ewert**, President of Sewall Gear Manufacturing Company, St. Paul, has recently been named to the Board of Trustees of Illinois College, Jacksonville, Ill. . . . **Howard E. Lind** is Director of Sias Research Laboratories, Brooks Hospital, Brookline, Mass. . . . **Sidney Sussman** has been appointed by Secretary of Interior Udall to membership on the National Technical Advisory Committee on Water Quality Criteria for Industrial Water Supplies. He has also been elected to the Manhasset (N. Y.) Board of Education. . . . **Lennart Wuosmaa** is Senior Electrical Design Engineer, Hydroelectric Equipment General Electric Company, Schenectady, N. Y. . . . **Adolph L. Antonio** has been recently appointed Senior Vice President of Research and Technology of the Aerojet—General Corporation. . . . **Lyle C. Jenness** is the Executive Secretary of the University of Maine Pulp and Paper Foundation.—**Robert H. Thorson**, Secretary, 506 Riverside Avenue, Medford, Mass. 02155; Professor **Curtiss Powell**, Assistant Secretary, Room 5-325, M.I.T., Cambridge, Mass. 02142; **Jerome Salny**, Assistant Secretary, Egbert Hill, Morristown, N. J.

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30th Reunion; Chatham Bars Inn, Chatham; June 7-10, 1968; for reservations: **Armand L. Bruneau**, 150 Broadway, New York, N. Y.

Ed Hadley, Assistant Secretary for the umbilicus (A.T. and T.), provides the following fascinating chapter: "It is either a great compliment or an acknowledgment of sucker tendencies to be volunteered for jobs without being asked if you're willing—just a tacit assumption that when the time comes, you'll produce. In my case I think I know which it was. So, to **Fred Kolb**, I'll be glad to help with the March class notes—to **Lou Bruneau** and **Norm Leventhal**, I'll enjoy greeting and registering returning classmates. To the Class of 1938, get your reservations in early—remember

that June 7-10 is only two months away. Those of you who have attended previous reunions already know what a whale of a lot of fun you will have eating, drinking, exercising, or merely reminiscing. Those of you who have never taken the plunge and those beautiful young wives who are worried about a weekend with a bunch of old men, you're sure to find congenial souls. If all else fails, it's a fabulous place for collectors of antiques and objects d'art. . . . My class news practically all comes from that most prolific of news gatherers, **Harold Strauss**. He and Henri have just been on a combined vacation and business trip to Hong Kong and Thailand. I had the good fortune to drop in on them two days after their return, with the following results (any libel action should of course, be directed against Harold)."

"From Bangkok: **Boonrod Binson**, VI, is Secretary-General of the National Energy Authority; **Charoen Pattabongse**, I, is a millionaire real estate man; **Momluang Sobhiit**, IV, is Professor in the University of Medical Science; **Oui T. Voodhigula**, I, is Director-General of the Thai Highway Department. . . . From Hong Kong: **Norm Li**, VI, is Managing Director of Elephant Radio Company, distributors of electrical products; **Al Louie**, VI, is Resident Manager for American President Lines; **C. C. Wong**, II, is Production Manager of Union Carbide. . . . Most of Harold's news from southern California appeared in earlier class notes. His mention of **Ben Thompson**, VI, reminded me that Ben and I roomed together in Baker House during an Alumni Officers' Conference several years ago. I took copious notes which I promptly lost. You'll have to come to the Reunion to hear about Ben, also about the Doctors Summerfield. John, II, recently quit Douglas to become Director of Research for Western

Airlines (I think). The Strausses will be there to fill you in on all the news, even though Susie graduates from San Diego State on the day before the Reunion. . . . News from New Jersey is rather sparse. Everyone I thought of has already sent in news during the past year, except, of course, for me. The Hadleys have a son, M.I.T. '65, working on the S.S.T. for Boeing in Seattle, another son, Hamilton, '66, a submarine supply officer out of Pearl Harbor, a daughter who expects to get married two weeks after the Reunion, and miscellaneous other sons and daughters including one studying under **Art Gould** at Lehigh. . . . Our recent interests have been in the field of international understanding with American Field Service exchange students from Norway and India and American Host Program guests from the Netherlands. I'm in the middle of an untenable dichotomy, working as a minor colleague of General **Austin Betts**, I, on the NIKE-X/SENTINEL Project to protect ourselves militarily, meanwhile trying to promote international peace through understanding, hoping that SENTINEL will never be used."

Also from the megalopolis, **Gretchen VanStratun Birge** has been plotting the course of Reunion fever. By our system of proportional representation, Gretchen is Assistant Secretary with additional specific responsibilities for two per cent of our Class (a proportion which has risen to five per cent in the Class of 1971, but which has always catalyzed a heightened interest an order of magnitude above the aliquot). "I have tried to reach everyone listed in the directory as living in New Jersey to see who is planning to attend the Reunion and who has news. **Henry Sieradzki**'s son is graduating from Brown; **Gerson Hermann**'s son from Antioch; and **Newton Hammond**'s daughter from Mary Washington.



Albert O. Wilson, Jr., '38 (left), the new President of the Cambridge Chamber of Commerce, presents a plaque to his predecessor, Joseph W. Gibson, in appreciation of Mr. Gibson's service

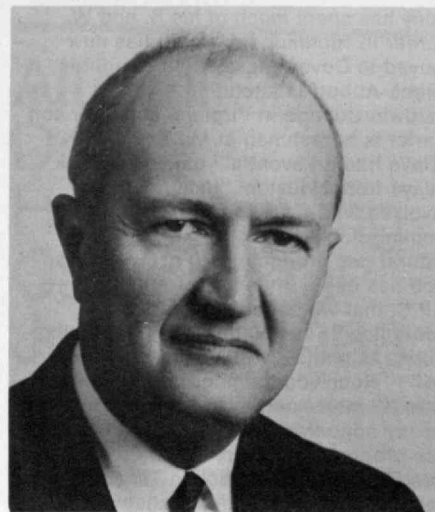
"in advancing the commercial, industrial, and civic interests in Cambridge." (Photo: Ed Pacheco from *The Magazine of Cambridge*)

Henry said he will definitely attend the Reunion, but for the others graduation dates conflicted. Both **Fred Schmitt** and his wife are planning to attend; so are **Paul desJardins** and the **Mike Formans**. The biggest bit of news is Mike's marriage, December 30, to Caroline Henze. They are just back from their honeymoon. . . . **Bob Tischbein**, **Sid Kodama**, and **Ralph Adams** said they hoped to make it. . . . I had a chat with **Jeanne Kitenplon Buxbaum** who has never attended a Reunion, but I think she might, as I've convinced her it would be fun! . . . George and I are also planning to make the Reunion. We were married three years ago in December so I am most anxious to have him meet the fellows. I am President of Birge Designs, Inc., in Englewood, N. J. We have our own lines of wall coverings and murals which we sell all over the world, and we import from Salubra, S. A., in Switzerland their scrubbable, fadeproof wallpapers which we sell all over North America. It is quite a switch from my old work of architecture and interior design at R.G. Nelson, Inc., in Providence but I love it."

Reunion Committee meetings in Cambridge have shown steady progress toward a most stimulating and exciting June 7-10, reports **Paul Black** (on leave as Chairman of Publicity). "**Lou Bruneau** and **Don Severance** have arranged periodic Committee meetings to review status. I am preparing some general mailings, one for January and one for March. . . . Several of us have started reaction centers by contacting quite a few of our classmates, and have a preliminary indication of attendance already from about 80. While making my contacts I came across some news-worthy items for the Notes. Both **Matt Abbott** and **Eric Reissner** have acquired property on the Cape (Cod, of course) and should have no trouble making the Reunion. . . . **Howard Banzett** has been moved by Alcoa from Lancaster, Pa., to Los Angeles where he is Manager of the Alcoa plant out there. He is not planning on moving his family from Pennsylvania until June. However, he hopes to be able to coordinate his move, his daughter's graduation from high school, and the Reunion so that he can participate in each of them. . . . Father **Bill Guindon** has moved inland from Boston College to Holy Cross where he is Chairman of the Physics Department. He hopes to be able to at least spend a few hours with us as he did in 1963. . . . **Charlie King** writes that his tour of duty in Paris is not up until August 1, 1968, so that his attendance is extremely doubtful. However, he sends his best wishes to all of the Class and plans to be on hand for the 35th! . . . **Jim McGuire** was transferred by Monsanto from Everett to their headquarters in St. Louis shortly after the 25th Reunion. He has not been East lately but hopes to arrange a trip back for the Reunion. . . . **Don Mitchell**, who is now in Milford, Del., is a little dubious about attending but has

hopes. . . . **Henry Sieradzki** is now with Curtiss-Wright in New Jersey. He is planning on combining attendance at Hank, Jr.'s, graduation from Brown in early June with Reunion. . . . **Milt Wallace** is now in Richmond, Va., and is planning to attend. You may have noted that his younger brother Harold, who worked with me at Sylvania 15 years ago was recently made a Vice President of E.G.G. . . . **Bill Whitmore** writes from Los Altos, Calif., where he is still at Lockheed's Missile and Space Division, that he hopes to arrange a trip back East at the time of Reunion." . . . Just in today's news I find **Wenz Wochos** has been elected President of I.T.T. Cannon Electric, headquarters in Los Angeles. After moving to the home office in 1963, Wenz moved rapidly, becoming Director of Operations and Vice President in 1965, and Executive Vice President in 1967. . . . Keep a sharp eye for the mailings, and let's be sure none fails to get the message!"

Speaking of **Charlie King**, a note from the man himself says: "Have been in France for three years now, where I am Manager of European Operations for Hydrocarbon Research, Inc. One plus factor of living in France is that one can play golf the year round! I am a member of St. Nom-la-Breteche, where I can be found almost every weekend. Also I am a member of the M.I.T. Club of France." . . . At the M.I.T. Club of Rochester's Christmas Luncheon (planned for a comparing of notes with today's undergraduates, and an introduction to them of high school seniors evaluating M.I.T.), the Class of 1938 scored highest in alumni attendance! **Bob Bowie** and **Dan Suter** found a break in Kodak's Government Sales and Industrial Engineering, respectively. **Vernon Lippitt** was on hand with his daughter Linda—a freshman at M.I.T. Linda shared her enthusiasm for the Institute's Math Department with several probing high school guests. Completing the quadruplet, I was there with my son Jay (only a sophomore in high school, but I am trying to help him realize how broad is the challenge)! Additionally we had a report on **Ravi Kirloskar**. Van Hansford, '37, visited him in Bangalore in November. Because Ravi had just taken delivery on a die-handler built by Van's Morley Machine Company. Van stopped while in the neighborhood, and had a grand tour of the Kirloskar Brothers Bangalore plant, in which Ravi manufactures electric motors and generators up to 50 kw. With the school tie bond Van was also a house guest and transmits Ravi's enthusiastic greeting to the Class. There is hope of his joining us in June, since one daughter is now an exchange student in Pennsylvania, and his wife is at the moment visiting in Canada. Furthermore, at the Kirloskar home in Bangalore, Ravi is foster-father to an American girl living with the family as an exchange student. . . . **Ira Lohman** reports from Saratoga, Calif.: "The highlight of our year, an event which took a lot of preparation



L. S. S. Smith, '38

but which turned out to be a lot of fun, was the marriage of our daughter Linda to Robert Spence on June 24. All grandparents and several aunts and uncles were on hand to toast the bride and groom. The weather couldn't have been better. Linda and Bob spent the summer near Bob's family in Wilton, Conn., where he worked for Perkin Elmer. They are now happily settled in a small apartment on the Stanford campus while Bob finishes his M.B.A. Linda works for *Sunset Magazine* (a sort of *Better Homes and Gardens* magazine for the western states). Judy returned for her second year at Christian College, Columbia, Mo., after spending the summer working in the dining room at Elkhorn Ranch in Montana. Guy worked for I.B.M.'s Data Processing Division this summer following his graduation from high school. He is now an enthusiastic freshman at Pomona College in Southern California. We are looking forward to having both Judy and Guy home for the holidays as well as having Louise's mother here from Boston. Dale is a busy seventh grader, active in scouts, wild about horses, plays the guitar and flute, and in her spare time makes things. Never a dull moment here although it does seem odd to have only one chick at home. I keep mighty busy at I.B.M. but find time to fly or keep up with photography. Louise is taking a course in oil painting, and plays some tennis. In February we had a brief but glorious trip to Hawaii. In July we travelled to the ranch to visit Judy, via Glacier National Park. The most fun was a two week hedgehopping flight in a Cessna 182 in October, covering much of the southwest as far as New Orleans. We saw Bryce Canyon, Taos, New Mexico, Carlsbad Caverns, and spent a couple of days on a ranch near Tucson. For four days in New Orleans we dined at gourmet restaurants, wandered in the Old French Quarter and had a ball!"

Stone and Webster have appointed **Tony Smith** as Construction Manager in the headquarters office, Boston.

Tony has spent much of his S. and W. career in Richmond, Va., but has now moved to Dover, Mass. Their daughter Minna-Abbott is attending Mary Baldwin College in Virginia, and their son Carter is a freshman at M.I.T. . . . "Have had an eventful year," **Bob Park** relays from Houston. "I am no longer involved with the Federal Power Commission Area Rate Hearings for natural gas producers." (For five years, Bob has been "trying to persuade F.P.C. that we should know more about how to run Natural Gas Producing Business than Government Agencies do!") "Received the honor of a citation from 32 major oil and gas companies for my appearances on behalf of the gas producing industry in F.P.C. Area Hearings. I am now back in Texaco natural gas operations management, with a further change forthcoming on the first of the year! We now have a delightful new home and a larger mortgage, but only one-half block from where we formerly lived. Also in August I became an American Contract Bridge League Life Master; do we have any others in the Class of '38?" . . . Regretfully we note the death of **Sam Swasey** in that Course XIII Nirvana, Marblehead. . . . Three months to Reunion! If your reservation isn't in, now is the time to phenagle, readjust your schedule, and search diligently for compelling business to take you to Chatham June 7-9 and Cambridge June 10!—**Frederick J. Kolb, Jr.**, 211 Oakridge Drive, Rochester, N. Y. 14617

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C. Herebert Wheeler, M.Arch., is Associate Professor of Architectural Engineering at the Institute for Building Research at Pennsylvania State University, and at present is directing two investigations under research grants from the American Institute of Architects. He is the senior author of *Emerging Techniques of Architectural Practice* published in 1966. . . . **John Blattenberger**, V-S.B., is now Assistant Manager of the Product and Process Research Division of the Cities Service Oil Company. He joined Cities Service as Supervisor of the Industrial Lubricants Section in March, 1957, and previous to that worked for the Sun Oil Company. . . . **Divo Tonti**, X, XV, has received the Columbian Foundation Annual Achievement Award, which is given to individuals of Italian descent who have made outstanding contributions to their community. Divo was cited for his various civic and cultural activities and in particular for his efforts in behalf of the Garden State Arts Center. . . . **Recardo Menendez Castillo**, X-S.B., drops the note that he is President of Industrias Memper A. A., a group of steel foundry, bronze foundry and machine shops supplying equipment for the petroleum and automotive industry. He is located in Tlalnepantla, Mexico. . . . **George Niles**, X-S.B., pens the note: "During the past year I have been in Copenhagen, Denmark,

supervising the construction and testing of a large electrically shielded microwave anechoic chamber for the Technical University of Denmark. This chamber is the most advanced facility in Europe for microwave research from 50 mhz. The size is 10 x 10 x 20 metres and is built by my company, Emerson and Cuming, Inc., Canton, Mass." . . . **Willard Simpson**, I-C.E., writes: "Since returning from the service in 1946 (during this time I spent three and a half years overseas in Egypt, Liberia, Palestine and Turkey attaining the rank of Major in the Corp. of Engineers, U.S. Army), I have practiced civil and structural engineering in San Antonio, Texas, and Central South Texas. I am a partner in W. E. Simpson Company—Consulting Engineers, which was established by my father, the late W. E. Simpson (1883-1967, M.I.T. graduate of 1905). Among some of the recognitions of which I am most proud is the Presidency, '63-'64, of the Texas Section of the American Society of Civil Engineers, and the Engineer of the Year award which I received in 1965. My wife Betsy and I have a son at S.M.U. and two teenage daughters of whom we are very proud." . . . **Les Lees** notes that: "Since 1953 I have been at Cal Tech and am presently Professor of Aeronautics. Main interests are in problems of high speed flight, and lately, in plasma dynamics (ionized gas, not blood!), including the interaction of the solar wind and the moon and planets. Had the pleasure of giving the Fifth von Karman Lecture of the A.I.A.A. on October 23. Also enjoy serving on the Lunar and Planetary Missions Board of N.A.S.A. Our son David (17) is applying to seven different colleges for the class of 1972 (not M.I.T.!)." . . .

William Steber, VI-S.B., is presently Chief Engineer of the Columbus Missile Division of North American Rockwell Corporation, while **Louie Michelson**, VIII-S.B., writes that he is President of Lion Research Corporation (since April, 1967). He and his wife are now living in Lexington, Mass., while his daughter Barbara has gone to New York to join the Wells, Rich and Greene Advertising Agency. . . . As a final note, there are listed below new addresses for several classmates: **Charles DeMailly**, Plymouth Division of Emhart Corporation, Industrial Park, New Bedford, Mass. 02745; **Robert H. Levis**, Box 541, Alton, Ill. 62002; **David F. Lowry**, 442 Joan Drive, Fairfield, Conn. 06430; **Alexis G. Pincus**, 20 East Cedar Street, Chicago, Ill. 60611; **Charles L. Sappet** 575 Main Street, Apt. 2, Chatham, N.J. 07928; **John A. Vanderpoel**, Crescent Road, Concord, Mass. 01742.—**Alvin Gutttag**, Secretary, Cushman, Darby and Cushman, American Security Building, Washington, D.C. 20005

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Austin W. Fisher, Jr., has been promoted to Professor of Engineering Manage-

ment at Northeastern University. He joined Northeastern's faculty in 1965 as associate professor of engineering management. He was formerly associated with Arthur D. Little, Inc., Cambridge, Mass. . . . **Sam Fry** has returned to this country after a year in Munich, West Germany, where he helped the Germans in their start on their first scientific research satellite. Sam has one daughter now attending the University of Munich and another in the Peace Corps in Tunisia. . . . **Stephen W. James** has embarked on his own business venture as a Manufacturer's Representative specializing in the sale of vibrating conveyors and sand handling equipment. . . . **Charles W. Hargens** is the recipient of the highest grade award possible in The Institute of Electrical and Electronics Engineers, Inc. He has been elevated to the Grade of Fellow in the 160,000 member I.E.E.E. for outstanding professional contributions. This distinction is awarded by invitation of its Board of Directors only, and is a hallmark of unusual distinction conferred only upon persons of outstanding and extraordinary qualifications in their particular fields. Charles citation reads: "For contributions in the application of electronics to bio-medical instrumentation." Presentation of the Fellow award certificate is made locally by the I.E.E.E. Section to which each Fellow belongs. Recognition of the award will also be made by the President of I.E.E.E. at the Annual Banquet, March 20, 1968, during the I.E.E.E. International Convention in New York City.

Professor **John F. Wallace** was a recipient of the 1966 Electric Furance Conference Award which was presented to him at the All-Conference dinner of the 1967 Operating Metallurgy Conference at the Palmer House, Chicago, December 13, 1967. He received the award with two associates for their paper entitled "Grain Refinement of Steel Casting." John is Professor of Metallurgy at Case Institute of Technology in Cleveland, Ohio. The Conference is sponsored by the Metallurgical Society (T.M.S.) of the American Institute of Mining, Metallurgical, and Petroleum Engineers (A.I.M.E.). . . . **Edward G. Sherburne, Jr.**, formerly editor of *Science News* and Science Service's science news syndicate, has been appointed Publisher. Science Service, founded in 1921 for the popularization of science, is a non-profit organization that publishes the weekly magazine *Science News*. It services newspapers with stories through its daily syndicate, and introduces youngsters to science through its monthly kits of "Things of Science" and its sponsorship of science fairs and the Westinghouse Science Talent Search. Edward joined Science Service as Director in June 1966. He was formerly associated with the American Association for the Advancement of Science. He retains his title as Director, the chief executive of Science Service,

the position he took over from the late Watson Davis who retired last year after having directed the organization since 1921. . . . **William K. Hooper** is among those featured in the October 24, 1967, issue of the *Journal-Advertiser* under "Who's Who In The Mayors Conference on Human Rights and Opportunities." Bill is identified as a Planning Council Member in Danbury, Conn., where he is active in civic affairs. He is Executive Vice President of Republic Foil, Inc., with which he has been associated in an executive capacity since 1956. He is a director of the Anderson Power Company, Boston, Mass., a member and former director of the Aluminum Association. Prior to coming to Republic-Foil, he was associated with Sperry Products, Inc., and American Smelting and Refining Corporation. He is also Associate Director of the Fairfield County Trust Company.

Victor G. Forzley is the author of an article entitled "Fourth Party Monitor For Construction Projects" appearing in the November, 1967, issue of *Petro/Chem Engineer*. In essence, it describes an auditing and reporting service to management for keeping management informed of progress on all aspects of a project and provide early warning signals as to problem areas. Cost of the service is point five per cent to one per cent of the capitalization of the project. The full article is well worth reading by those involved in substantial construction projects. Victor is a senior chemical engineer with the consulting firm of Ford, Bacon and Davis, Inc., New York. He holds degrees in civil, mechanical and chemical engineering. He also earned a master's in Business Administration.—**Walter J. Kreske**, Secretary, 53 State Street, Boston, Mass.; **Everett R. Ackerson**, Assistant Secretary, 16 Vernon Street, South Braintree, Mass.; **Michael Driscoll**, Assistant Secretary, 63 Center Street, Nantucket, Mass.

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The magazine *Industry* for November, 1967, contains an informative write-up of Model Shop Associates, Inc., of Sudbury, Mass., and its marketing subsidiary, Spider, Inc. **Jay J. Martin, Jr.**, Arrangements Chairman for our 25th Reunion to be held in June 1969, is President of Model Shop. Recently, Spider took to the road with a mobil show room which demonstrates the company's lathe line right at plant location (see November notes). . . . **Bill Ritterhoff**, General Manager of Bethlehem Steel Corporation's Burns Harbor, Indiana Plant, announced three top supervisory promotions on November 16, one of whom is John F. Becker, '53. . . . A press release of November 15 from the American Society of Mechanical Engineers announces that Honorary Membership in the A.S.M.E. is being conferred on **C. Richard Soderberg** and others in recognition of their

acknowledged accomplishments in engineering-allied pursuits. . . . On November 28 Celanese Corporation announced the appointment of **Gay V. Land** as Vice President, Corporate Development, with headquarters in New York City. He had been Vice President, Corporate Planning and Development, of Southern Natural Gas Company (see July 1966 notes). Gay will guide plans to optimize long term growth and profitability, and will also be responsible for reviewing diversification, acquisition and merger opportunities. Gay lives at 1 Old Hill Road, Westport, Conn., with his wife and four children. He is a member of the M.I.T. Club of New York.

One of our roving reporters, who modestly suggests that I not use his name, tells us that as a result of a trip to Cleveland, Ohio, in November he learned that **Bruce Fabens**, who is Secretary of Lamson and Sessions Company (fasteners), has been active as an educational councillor and as a sailor of thistle boats out of Mentor Harbor. Last summer he competed with **Joe Shrier** on several occasions. Joe recently owned two boats but has sold his thistle and is concentrating on a Cal 25. In addition to sailing, Joe is active as a skier and his youngsters are also ski bugs. Joe is a broker with Goodbody and Company in downtown Cleveland. . . . **Han T. Liu** reports, by note of November 17 from Hong Kong accompanying his Alumni Fund contribution, that he has been in Hong Kong since 1948. He is in the textile manufacturing business. His present position is Director of South Textiles Limited. Thanks for that note, Han. . . . **Scipio de Kanter**, 28 Crystal Drive, Cocoa Beach, Fla., President of the M.I.T. Club of Cape Kennedy (founded 1965), and **Douglas E. Root, Jr.**, were active in organizing the First M.I.T. Alumni Florida Festival which was scheduled to be held Saturday, January 27 in Orlando, with an optional tour of Cape Kennedy to be conducted on Sunday (see December Review, page 74). Doug Root, of Central Florida Showcase, was scheduled to be Master of Ceremonies at the M.I.T. Banquet Saturday evening at which Dr. Killian was to be one of several distinguished guest speakers. Skip de Kanter worked on arrangements including coordination of the club delegation from the Cocoa Beach area.

Christmas cards arrived from the faithful. Jane and **Ed Cochran**, Hagerstown, Md., report that their son Eddie graduates from Lehigh University this year. . . . Ellen and **Dick Kulda**, Orange, Calif., report a good year but not the high adventure of 1965 and 1966 (see notes for March 1966 and March 1967)—only one broken arm (Gay, 4), and a broken toe (Greg, 16). Dick and a colleague have formed a new corporation and are devoting full time to it. . . . Pearl and **Bob Veitch**, Huntington, N.Y., were looking forward with great anticipation to a new arrival. Bob is also thinking about the Class of 1944 and looking ahead to the

Alumni Day Homecoming Cambridge June 10, 1968

25th Reunion in 1969. He has no plans to attend but he is thinking about it. Does anybody else have anything to report as a result of exchanging season's greetings? (See last paragraph of December notes.)—**Paul M. Robinson, Jr.**, Secretary, Navy Information Systems Branch, Op-90F, Pentagon BD770, Washington, D. C. 20350 202-0X7-0264 or 7710 Jansen Drive, Springfield, Va., 22150, 703-451-8580

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Bill Shuman of Amherst, N.H., forwarded in mid-December a Boston *Herald* clipping telling of **Gerald L. MacKinnon's** tragic death on Thursday, December 7; unfortunately, there is no way of softening the cause—murder. Jerry, the owner of G.L.M., Inc., fiberglass specialists in Windham, N.H., was shot in the back by .25 calibre slug while at his shop. You will recall that Jerry was a native of Boston and had lived in Danielson, Conn., and Canobie Lake, N. H., before moving to East Derry, N.H., nine years ago. As an undergraduate Jerry was President of our class sophomore and junior years, as I recall, and was a member of Osiris. Survivors include his wife, Mrs. Nancy (Williams) and two adopted children, Marcia and Geoffrey, all of Derry, as well as his mother of Roslindale, Mass. I know you all join me in extending the Class' deepest sympathy to Gerry's family. . . . In mid-October, **William A. Loeb** joined the N.Y.S.E. firm of Kahn, Peck and Company as Director of its new Department of Science and Technology. Chappaqua, New York's own, who is also President of Iso Nuclear Corporation, has been active in nuclear science since his Institute days. Bill will direct studies of investment opportunities in the atomic, computer, automation and energy conversion fields. You may recall that Iso Nuclear was founded in 1965 for preserving meats through the use of nuclear radiation rather than refrigeration. As former chief engineer of United Nuclear Corporation, Bill was in charge of the development and manufacture of nuclear power plants, fuel elements, and electronic instrumentation.

Maryruth C. Jeffries reports that she is now a research assistant in the Department of Physiology at the Dart-

mouth Medical School, Hanover, N.H.

... **Mrs. Felix Cohen** (nee Frieda S. Omansky) of Waban, reports that her oldest son, Stephen, is a member of the Class of '70. As Frieda so aptly states "what better emphasis to our 25th Reunion!" ... **Miles A. Libbey** is currently Director, Systems Development Division, of the American Institute of Physics, responsible for the developing of a design of a national information system for physics. Miles was recently elected to a two year term as Councilor-at-large of the American Society for Information Science. ... **Jim Barabee** continues as Quality Manager at Hoover Ball and Bearing Company, Ann Arbor, Mich. ... **Tom Gurley**, XIII-A, retired from the U.S. Navy January 1, 1967, as Captain and is presently with Stanwick Corporation of Arlington, Va.—a defense oriented management engineering firm. Tom is working on configuration control and maintenance management of aircraft carriers. ... **James W. Shearer** reports that he has been with the Lawrence Radiation Laboratory in Livermore, Calif., for the past ten years. Gail (Reed College, '47), Jim and the two boys, Jimmy 13 and Peter 11, had the good fortune to visit Rome in '65 and Paris in '66. Jim plays trumpet in the local Livermore Symphony—his first chance to play regularly since the R.O.T.C. band in 1942!

Richard B. Marsten has just been appointed as Chief Engineer of R.C.A. a Astro-Electronics Division in Princeton, N. Y., where he will be responsible for the design, engineering and testing of spacecraft and space equipment. Dick joined R.C.A. in 1956 as Manager, Advanced Radar System at the Missile and Surface Radar Division in Moorestown, N. J., and was named Manager of Communication Systems at the Astro-Electronics Division in 1961. Dr. Marsten, who received his Ph.D. from Pennsylvania, is a contributing author and editor of the book, *Communication Satellite System Technology*. ... **Warren J. Harwick** has been elected Vice President of Research and Development of Rex Chainbelt, Inc., Milwaukee, Wis. Warren will be headquartered in Rex's new Technical Center which controls the R. and D., as well as product application work, for Rex's 17 plants. Prior to joining Rex in 1965, Warren was with General Electric as manager of the Mechanical Engineering Advanced Technology Lab in Schenectady, N. Y. ... **William K. Linvill** was elevated to the grade of Fellow by the Institute of Electrical and Electronics Engineers for his contributions to sampled-data and computer control systems and to systems analysis techniques. ... **Mrs. Jephtha A. Wade** (nee Emily Vandebilt) is the President of the Boston Zoological Society hoping to help build a better zoo for Boston. Jeph and Paddy have four children—15 to 3½, and are much involved in conservation work through the Bedford Conservation Commission and the Massachusetts Audubon Society.



Richard B. Marsten, '45

Jephtha continues as a partner at Choate, Hall and Stewart in Boston.

Robert S. Buxton and **Clifton W. Corbett**, '47, founded systems Control Associates about a year ago in Media, Pa., as manufacturers representatives in combustion control, gas analysis, telemetering, remote supervisory control, and standby power systems. ... **Donald A. Ostrower**, co-founder of Vollmer-Ostrower Associates was reelected President of the New York Association of Consulting Engineers in September. ... We welcome the transfer or reaffiliation with the class of **Jack Uretsky**. Unfortunately, your Secretary is confused as to his address. The institute says Argonne National Labs and **Max Ruehrmund** says Fairlawn, N.J. Which is correct, Jack? ... Early last fall Battelle-Northwest of Richland, Wash., indicated that a deactivated Atlas-F missile silo at Vandenberg Air Force Base, California would be converted into the world's largest high energy-rate forming machine to investigate the feasibility of scaled-up metal forming and material preparation processes. **Kirk Drumheller**, Manager of Materials Development at Battelle-Northwest, and our Class President at graduation, handled the news release and will be charged with the installation. Every time I hear Kirk's name all I can visualize is the image of one Mr. D. upholding the bar in a South Bend, Ind., gin mill in his gray midshipman's uniform!

A most delayed acknowledgment and thank you to **Nick Mumford** for his September letter giving us a rundown on last year's Alumni Seminar. In addition to Nick and Rosemary, the Class was represented by **Jim Brayton** and **Ellen**, neighbors in nearby Wilton, Conn. Nick reports that he also saw Otto Kirchner, '49, back in Cambridge for a counselor's meeting from Boeing-Seattle. You will recall that Otto was a classmate until he joined the V-5 program. A July visitor to the Mumfords was one **Clarence Howell**, another V-5er, enroute to Expo '67. Red, as many of you know, is Chief of Aeronau-

tics for the supersonic transport being built, again, by Boeing-Seattle; we further understand that Red is quite an authority on sonic booms. Lastly, Nick reports that **George Upton** has recently been promoted to Manager of Technologies at the Aeronautics Division of L.T.V. in Dallas, Texas.

As always we enjoyed our many cards from 45-ers. To mention a few—**Jerry Patterson** of Binghamton, N.Y., reports that it has been "The Year of the Horse" as Mark, a high school senior, has been doing well in many shows. Further, that both Jerry and Libby have started riding again. Fran and I look forward to seeing the Pattersons at the OxRidge Show here in Fairfield County, Conn., next summer. ... **Nick Mumford** and Rosemary's wonderful card depicting a manger scene with their Robin looking quite proper as a shepherd was most welcomed. ... Our kids fully enjoyed the Hickey family picture with the four children properly clothed for the hippie movement; we were told that this was a special picture! On this cold snowy winter night we would be most remiss were we not to thank the **Sherry Ing's** for their warm and glowing Hawaiian greeting—hauoli makahiki how!—**C. H. Springer**, Secretary, c/o Firemen's Mutual Insurance Company, 420 Lexington Avenue, New York, N.Y. 10017

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As you read these notes the winter with its skating and skiing will be pretty well behind us here in the East but as I write these few notes the weather outside is a rather cool subzero. ... **Claire** wrote that **Bob Seidler** and she planned to take the family skiing in Vermont over Christmas if the snow conditions were decent. Gina and I plan to take our children to Canada toward the end of February. Are many of the rest of you still or now doing some skiing? **Henry Lee**, now with the Epoxylite Corporation, was Co-chairman in the late fall of a symposium at the Disneyland Hotel. The subject was the status of artificial and natural membranes for use in medicine. ... In reading the financial page this morning I note that Sylvia Porter in her syndicated column has **Jim Phillips** as her reference for analyzing the 24-month performance of the Dow Jones industrials. Am pleased to see the caliber of her source people and maybe Jim will get the market squared away. ... **Fred Veith** was elected Vice President and Director of Pfizer International, subsidiary of Charles Pfizer. He has been with Pfizer since leaving school and has been involved with the International Division since 1954. In 1961 he was named Director of Production and in his new capacity will be Vice President on Manufacturing. As I understand it this job will be in New York, so Fred and Cornelia will remain in Old Greenwich. ... Other location changes

find **Jordan Baruch** now with Bolt, Beranek and Newman in Cambridge; **Paul Cook** with Raychem in Menlo Park, Calif.; **John Lynch** with Lockwood Green in New York City; **Gerhard Reethof** now residing in State College, Pa. . . . There were, as usual, quite a few address changes reported during the month. The most interesting appearing to be **Steve Evans'** move to Genese Belgium where he resides at 16 Ac Leguier Rhode Street. Captain **Robert Blount** is now at 7020 Hector Road., McLean, Va.; **Mitch Keamy** at 18275 Surrey Lane, Brookfield, Wis.; **John Sixsmith** 79 Fir Street, Park Forest, Ill. Some moves in the N.Y. area: **Bob Devine** has moved to 125 E. 87th; and **Fred Brodersen** to 120 Cabrini Boulevard. That will be it for this month. Let us hear from you.—**Dick O'Donnell**, Secretary, 28516 Lincoln Road, Bay Village, Ohio 44140; **Arnold Varner**, Harvey Hubbell Company, Newtown, Conn.

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20th Reunion: Harbor View, Edgartown; June 7-10, 1968; for reservations: Adolf F. Monosoon, 85 Baldpate Hill Road, Newton Center, Mass.

You will be pleased to know that we have many classmates collecting honors of one sort or another this month. . . . **Fred C. Bailey** has been elected President of the Society for Experimental Stress Analysis. Fred's work has included engineering activities in a group of projects relating to the measurement and statistical analysis of motions and stresses in ships at sea. He is President of Teledyne Materials Research and resides in Lexington, Mass., with his wife Mary and three children. . . . **William J. Harris, Jr.**, has been appointed Assistant Director, Technology, at the Columbus Laboratories of Battelle Memorial Institute. He also assumes membership on the research center's Senior Technical Council within which he will be primarily concerned with activities that bear on public policy and major national objectives. . . . **Robert E. Day** has been promoted to Regional Sales Manager for The Foxboro Company; his territory covers New England and a number of the Middle Atlantic States. . . . **Benjamin Kessel**, Vice President and General Manager of Honeywell, Inc., Computer Division, Framingham, has been elected a Director of Waters Associates, Inc., Framingham.

Martin A. Timan, '56, President of the management consulting firm of Timan/Chicago, has been elected Chairman of the Board and Chief Executive Officer of the Mohawk Tablet Company, Chicago Heights, Ill. . . . **Werner R. Kirchner** has been appointed General Manager of Aerojet-General Corporation's Space-General Division, El Monte, Calif. . . . Last, but by no means least, both **Charles I. Beard** and **Wilfred Roth** have been elected to the grade

of Fellow in the Institute of Electrical and Electronics Engineers. Naturally neither was Course VI. . . . Others are busy communicating—Irwin I. Lebow is co-author of an article, in I.E.E.E. *Transactions on Communication Technology*, entitled "A Sequential Decoding Technique and Its Realization in the Lincoln Experimental Terminal." He discusses a mechanization of signal coding, to approach the signal channel performance predicted in Dr. Shannon's theorem, which was carried out at Lincoln Lab. . . . **Dean S. Ammer** was a speaker on the subject of material management at the District Nine Fall Conference of the National Association of Purchasing Agents. Dean is Research Professor and Director of The Bureau of Business and Economic Research at Northeastern University. . . . **Donald H. Archer** spoke on the subject of large scale use of the fuel cell at a joint A.S.M.E.-I.E.E.E. conference on power generation in Detroit. Don is with the Westinghouse Research and Development center in Pittsburgh. . . . Col. **Norman E. Pehrson**, District Engineer of the Los Angeles District of the Corps of Engineers, spoke before the Society of American Military Engineers on the subject, "The Los Angeles District—International Engineers." Consideration of his subject in conjunction with the fact that his district covers some 345,000 square miles again raises the question as to just where one does find the Los Angeles city limits.

"Communication is the root idea of our age, just as evolution or relativity was for previous generations," contends **Robert E. Mueller** in his new book, *The Science of Art*, published by John Day and Company. The book, Bob's fourth, explores the relationship of cybernetics to art and is thus well beyond the ken of your reviewer. . . . The following are abstracted from notes sent in by alumni. . . . **Edward R. Allen, Jr.**, is Executive Vice President of an investment counselling firm managing assets of some \$700 million. He resides in Houston with wife Nancy and three sons. . . . **C. Gregory Bassett** is Assistant Director, Urban Renewal and Housing, National Capital Planning Commission, Washington, D.C. . . . **Lewis A. Blodgett, Jr.**, is a research meteorologist at the National Weather Records Center at Asheville, N. C. . . . **Buckley Collins** is serving his second term as City Commissioner and also serves on the Planning Commission in his home town of Port Huron, Mich. He is a consultant in civil engineering. . . . **Ezra Garforth, Jr.**, is President of Philadelphia Steel and Wire Corp., and is currently building a new 220,000-square-foot plant which will enable Philadelphia to double sales in the product area of cold rolled strip steel and flat wire. . . . **Sydney L. Crook** is systems engineer with Avco Corporation, Missile Systems Division, Wilmington, Mass. . . . **William C. King** has been elected Vice President of Gulf Oil's chemical activities in Europe, and the King family has left Pittsburgh to set up residence

in London. . . . **Henry W. Kinnan** is staff meteorologist for W.C.K.Y.-T.V. in Cleveland. He has served for some ten years as a member of the American Meteorological Society's board for television and radio weathercasting. . . . **Ralph E. Segel** is Professor of Physics at Northwestern and also serves on the staff of Argonne National Laboratory. . . . **Ellarson R. Stout** is with Perkin Elmer Corporation in Wilton, Conn. . . . **G. Richard Worrell** is currently head of systems engineering and engineering research in the Research and Development Department of Atlantic Richfield Company. He recently returned from a one month trip to Japan to begin operations in a joint venture in the detergent field.—**Richard V. Baum**, Assistant Secretary, 6711 N. 22d Street, Phoenix, Ariz. 85016; **John T. Reid**, Assistant Secretary, 22 W. Bryant Avenue, Springfield, N. J. 07081; **Robert R. Mott**, Secretary, Kent School, Kent, Conn. 06757

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The mailbag is always interesting but never more so than this month when no less than three long articles tumbled out, each of which I have read with fascination. The first is titled "Can Sweden Defend Herself?" by Commander **William W. Lang**, VIII. It appeared in *U.S. Naval Institute Proceedings*, for September, 1967. The over-simplified answer: Yes, except against nuclear attack. . . . The second article, also by a navy officer, is "Fleet Communications Support—Via Satellites" by Captain **M. D. Van Orden**. The gist of Captain Van Orden's report: The Navy was fast approaching a communications crisis due to overcrowding of the frequency bands when, in the early '60's, a communications satellite was placed in orbit which appears to have unlimited promise. . . . The third article, by **Donald O. Smith**, is on "Magnetic Films and Optics in Computer Memories." It held my interest because, like many engineers, I have been going back to school to brush up, mostly on math, and this paper was full of the kind of math that I've been exposed to lately. . . . **Ed Stoessel** has been promoted to Vice President of the George A. Fuller Company, the building construction firm in New York. Ed lives in Stamford, Conn. Since 1957 Ed has worked on many well-known buildings in and around New York. They are: 425 Park Avenue; Pepsi Cola World Headquarters Building, on Park Avenue; Time and Life Building (all New York City); he was general superintendent on three New York World's Fair Exhibits, Bell Telephone Pavilion and the Boy Scout and State of Pennsylvania exhibits; project manager on the Trans World Airlines terminal expansion at John Kennedy Airport; project manager at the Brookhaven National Laboratory, Brookhaven, N.Y.; and presently is in charge of the construction of #1 N.Y. Plaza, New York City. In addition to this he administered to operational assignments as field personnel manager, and special activities in South Africa and the Philippines.

The annual Christmas letter from the **Jack Fogarty**s reveals that he is in charge of Quality Control, Service and Repair, and Audio Visual Reproduction operations for E.L.C.O. in the Philadelphia area (Montgomeryville). . . . **Harold G. Ingraham, Jr.**, has been elected Actuary at New England Mutual Life Insurance Company, Boston. He will be responsible for ordinary product design and development. He lives with his wife, Sandra, and three children, Jeffrey, Elizabeth, and Suzanne, at 29 Valley Road, Dover, Mass. . . . An announcement in the American Paint Journal tells us that **John Gulick** has been appointed Sales Representative for the Pfizer, Minerals, Pigments and Metals Division. From headquarters in Cincinnati, he will be responsible for the sale of iron oxide pigments, inorganic chemicals and non-metallic mineral products in Ohio, Kentucky, Indiana, and Michigan. . . . **Norman Andrews** is the model who appears in the advertisements for Peck Bindery, Inc., of West Haven, Conn. Norman is also President of the company which is 150 years old and one of the largest of its kind in New England. . . . **William G. Atkinson** has been named to the position of Overhaul Program Director for the Electric Boat Division of the General Dynamics Corporation in Groton, Conn. Joining Electric Boat in 1949, Bill was formerly weapon system manager, a position he held since 1965. Prior to that, he was chief of product support and was also chief hull structural designer and contract manager for the Polaris submarine George Washington. . . . **Orlien Becker** sends word that he is Engineering Manager for the Aerospace Division of the United Control Corporation in Redmond, Wash.—**Fletcher Eaton**, Secretary, 42 Perry Drive, Needham, Mass. 02192

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William Fincke recently joined Dynamics Research Corporation in Stoneham, Mass., where he will operate in the System Analysis Group. Bill was formerly with Sperry Gyroscope. . . . We previously reported that **Murray Gell-Mann**, Ph.D. VIII, is the Robert Andrews Millikan, Professor of Theoretical Physics at Cal Tech, but we have now been informed that he is currently on leave at the Institute for Advanced Studies, Princeton, N. J., and that he has been awarded the Franklin Medal, the highest scientific award of the Franklin Institute, for 1967. It is noteworthy that the first recipient of this award was Thomas Edison, and among the other scientists so honored were Orville Wright and Albert Einstein. Dr. Gell-Mann's activities in the field of elementary particle physics earned him this award. . . . A couple of our classmates were participants in the 1967 Metals Congress: **Henry Hahn** presented a paper on whisker reinforced metal composites, and **Erv Underwood**, S.M. III, who is with Lockheed, Georgia, was Co-chairman of the session on Education. . . . **Peter M. Lang** is now



Harold G. Ingraham, '49



Harry Lowell, '51

covering Europe for N.U.S. Corporation, a nuclear power plant consulting engineering firm. . . . **John Morganthaler** is Director of Advanced Technology Research for Bell Aerosystems Company. . . . **Harry Lowell** was elected Vice President of Adcole Corporation, Waltham, Mass. Harry has been with Adcole since 1961, and, most recently, was Contract Administrator for Satellite and Rocket Instrumentation, prior to this he was with Dewey and Almy Chemical Division of W. R. Grace. The Lowells have four children and live in Boxford, Mass. . . . Also among the executive set, **John Magee** has been appointed Senior Vice President of Arthur D. Little, Inc. He has been there since 1950 and has been the head of the management consulting services of the firm since 1963. John is President of the Operations Research Society of America and has written a number of articles and books on the logistics of distribution.

David Ragone is the Alcoa Professor of Metallurgy at Carnegie-Mellon University in Pittsburgh. This is a return to teaching for Dave—he left the University of Michigan five years ago to become Chairman of the Department of Metallurgy and Assistant Laboratory Director at General Dynamics' General Atomic Division. Dave is also one of four men "prominent for their contributions to science and technology" who have been appointed to the Commerce Technical Advisory Board by the U.S. Department of Commerce. Dave and Kit have two children: Christine, 4, and Peter, 3. . . . **Paul Rothery** was one of three top businessmen in the Chicopee, Mass., area appointed to leadership positions with the United Appeal. Paul was appointed Vice-Chairman for manufacturing firms. . . . **Bernard P. Spring**, M. Arch., was written up in the October 9, 1967, issue of the New York Times after being appointed Director, Research Center for Urban and Environmental Planning, Princeton University. . . . **Al Stefanick** is Chief Electrical Engineer, Nuclear Submarines, Electric Boat Division of General Dynamics Corporation in Groton, Conn. The Stefanicks have three children: the oldest, Veronica, has applied for admission to the Fall 1968 class at Jackson College for Women (Tufts), the youngest, Tom, they feel is M.I.T. bound, and the middle one? . . . **Alan H. Stenning**, S.M. II, is Professor and acting Chairman of the Department of Mechanical Engineering at Lehigh.

. . . We have a lot of Academicians in our class: last month we reported that **George Thompson** is an Assistant Professor in the E.E. Department at Rochester (N.Y.) Institute of Technology, and George, in response to the M.I.T. Fund solicitation, says that: "we (R.I.T.) welcome gifts from industry of new, state-of-the-art, electronic devices and training aids. We move to our new campus, south of the city, in June, 1968." I'm sure that if any of you who could help out with George's request would send items directly to him at R.I.T. he would gratefully acknowledge them.

Richard Valpey is presently employed by Sylvania Electronic Components Group, Microelectronics Operation, as an Advanced Research Engineer. Dick picked up his master's degree in physics last June from Northeastern University. He and his wife, Evelyn, a reading teacher at Holliston (Mass.) Junior High, have four sons. . . . **Cornelis Van Mook** is Principal Naval Architect at Dravo Corporation, Pittsburgh. Cornelis and Edith have two sons: Gary, 10, and Brian, 7. . . . **Dexter Whittinghill** has been with Campbell Soup for over 16 years and is now Manager of Industrial Engineering of their Chicago plant. Dexter spends his spare time "around the house, golfing, playing pond hockey, Boy Scouts," with Dexter, Jr. (13), and David (11), he helps out in little league and Pop Warner football. He, Norma and the boys manage to visit New England each summer, in time for the tomato season. . . . A new Department in the Tactical Systems Division of MITRE Corporation, Bedford, Mass., will be headed by **Alan J. Roberts**. He has been with MITRE since 1959, and before that he was a section head at M.I.T.'s Digital Computer Lab and at Lincoln Laboratory. . . . **William Wintz**, S.M. XI, wrote from Baton Rouge, La., that he enjoyed an unexpected and pleasant Course XI reunion when seven of the 21 fifty-oners in Course XI were present in New York to hear **Professor Sawyer** speak at the W.P.C.F. Convention. . . . **Donald Wong**, Mewlun and their 6-year old son, Nathan are living in Orange, Calif. Donald is with North American Rockwell. . . . This year's Fall Alumni Officers' Conference was held in San Francisco. Without repeating too much of what you have probably read, this was the first time that such a meeting was held outside of Cambridge. Not too strangely, the meeting was very well attended, but almost half of the attendees were from the East Coast! Your class was represented by **Mickey Alper**, **Breene Kerr**, **Fred Lehmann**, and **Howard Livingston**. . . . I have one last item that I would like to fit in, but space is running a little tight: another lovely letter from the **Robert Cushmans** describing their final trip through Europe prior to sailing back to the U.S. and Idaho Falls. You may remember the first installment in the December '66 issue of the Review—well, this one is even more exciting. Now, having acknowledged it, I will save it until an issue in which I will not have to

apologize for omitting the details—**Howard L. Livingston**, Secretary, 358 Emerson Road, Lexington, Mass. 02173; **Marshal Alper**, Assistant Secretary, 1130 Coronet Avenue, Pasadena, Calif. 91107; **Paul Smith**, Assistant Secretary, 11 Old Farm Road, N. Caldwell, N. J. 07006; **Walter Davis**, Assistant Secretary, 346 Forest Avenue, Brockton, Mass. 02401

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H. Richard Crowther was recently appointed Manager of the Shakeproof Division of the Illinois Tool Works, Inc., in Elgin, Ill. . . . **Dr. Jerome D. Waye** was recently appointed to the Board of Governors of the M.I.T. Club of New York, and is active on the Educational Council. . . . In addition to being Plant Manager of Corning Glass Works Canton Plant, **Joseph W. Hurley** is Director of the St. Lawrence County National Bank. . . . After 13 years in California with Kaiser Aluminum, **Tom Basits** accepted an offer from **Jim Klapmeier** to join Boatel Company as Executive Vice President. Boatel, which Jim founded, is the largest manufacturer of houseboats in the country. . . . **Arnold H. Berger** has been named Director of the Cleveland Commission on Higher Education, an agency to foster coordination among colleges in the county. Dr. Berger has been Assistant Director of the study commission which recommended the creation of Case Western Reserve University. . . . **Husevin Yilmaz** is a senior staff member of the Research and Development Division of the Arthur D. Little Company, doing major research in nuclear physics and in testing the general theory of relativity. . . . The Society of Women Engineers has elected **Anna Bailey** as Vice Chairman for '67-'68. Anna is Supervisor of Systems Analysis and Programming for Stone and Webster Engineering Corporation. . . . **Philip E. Hogin** was elected a director of the Western Electric Company and appointed Executive Vice President in charge of the corporate staff. . . . **Michael S. Ariens** has been named Vice-President, Engineering at the Ariens Company. He is active in many community projects including the Brillion Housing Authority (secretary), Brillion American Field Service Committee (chairman), Boy Scouts (secretary-treasurer), Girl Scouts (fund drive chairman), Chamber of Commerce, and Lions Club. . . . **James Wei** has been promoted to Senior Scientist at Mobil Oil Corporation's Research Department in Hopewell Township, New Jersey. Dr. Wei, wife Virginia and four children reside in Princeton.

James W. Sweeney has been named Director of Computer and Electronic Data Processing Laboratories at the University of Oklahoma. He was formerly Director of the Tulane University Computer Center. . . . Class President **Charles Masison** has accepted a position as Technical Director (Systems

Analysis and Systems Integration) at Raytheon's Submarine Signal Division Systems Laboratory in Rhode Island. . . . **Richard Charles**, a senior scientist at General Electric, gave a presentation on the thermodynamics of immiscibility in non-crystalline solids in a series of lectures on glass at the University of Missouri. . . . **Leonid Azaroff** has written three books on X-ray diffraction and on the solid state. . . . Another step up for **Paul Gray** at M.I.T.! Paul has just been made Assistant Provost with responsibility for the undergraduate education program. He will be on leave during the spring term and plans to take it in Scotland, visiting at a University. . . . Another classmate assuming new responsibilities at M.I.T. is **Richard Mills** who has been appointed to the new position of Director of Information Processing Services. He is presently Associate Director of M.I.T.'s Project M.A.C., and in his new position will be responsible for coordinating the growth and the interactions between M.I.T.'s many computer installations. . . . After spending a rewarding year in Japan, **Robert Evans** is teaching and conducting research on Japanese wage structure as Associate Professor of Economics at Brandeis University. Bob and Lois are recent proud parents of a baby girl, Linda.—**E. David Howes, Jr.**, Secretary, Box 66, Carlisle, Mass. 01741

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Hugh Bradley left the faculty of the University of Michigan last August to become Senior Operations Research Analyst for the Upjohn Company. In addition, he is Associate Editor of *International Abstracts in Operations Research* and adjunct Assistant Professor of Management and Economics at Western Michigan University. . . . **Phil Bryden** reports that he is now a Full Professor and Deputy Chairman of the psychology department at the University of Waterloo, Ontario, which has a staff 35. In addition, he published his 20th experimental paper. . . . **Peter Dulchinos** reports the birth of a third son, Gregory Peter. Peter is working on the support system for S.A.M.-D. at Raytheon. . . . **Murry Gerber** is Senior Product Engineer for Jacobs Manufacturing Company, and designer of the company's new "Automatic Brake Control" which is an anti-skid system for air brake trucks. . . . **Jacob Gubbay** reports that he was married April 2, 1967, and honeymooned in Europe and Israel—narrowly missing the coup in Greece and the Middle East war. Jacob is Principal Materials Engineer for the Electronic Data Processing Division of Honeywell. This April he will present a paper, "Selection of Materials for Noise Attenuation in Industrial Machinery," at the A.S.M.E. Conference. . . . Harvard's Astronomical Observatory designed and built an ultraviolet spectrometer which takes pictures of the sun from the orbiting Solar Observatory-IV launch last October 18. Co-director

of Engineering on the project was **Nathan Hazen**.

In an early January stop in Cleveland, I had a brief visit with **Joe Huber** and family in Akron. Joe continues to be enthusiastic about his work at Goodyear and his charming four-month old son. . . . **Dick Johnson** is a father of three (two girls and a boy). Dick is also Manager of Scientific Space Systems—advanced requirements for General Electric Reentry Systems Department. . . . **Nicholas Kiladis** writes that he is married and has three children. After completing his L.L.B. at the University of Baltimore in 1964, he was admitted to the Maryland Bar and works for the Contracts Department of Martin-Marietta. . . . **John Newman** was appointed Associate Professor of Naval Architecture of Tech last fall. . . . **Haig Parechian** reports a daughter, Sonia, was born on last September 15. . . . **John Patierno** was recently promoted to Chief of Astrodynamics and Propulsion in the Advanced Aircraft Systems Section of Northrup Corporation. He lives in Huntington Beach, Calif., with his wife and three children. . . . **Dr. David Quigley** is a resident in orthopedic surgery at Rhode Island Hospital.—**T. Guy Spencer, Jr.**, Co-secretary, M.I.T., Room E19-439, Cambridge, Mass. 02139; **Bruce B. Bredehoff**, Co-secretary, 16 Millbrook Road, Westwood, Mass. 02090

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Alan May recently forwarded a copy of the Annual Report of Elcor Chemical Corporation for whom he serves as Vice President of Finance. In view of the very rapid increase in earnings during 1967, I imagine that the finance job is a rather simple one. Knowing Alan, however, I am sure he is involved in great activity. Alan comments in his letter that Elcor is one of the fastest growing companies in the U.S., and that they are making plans for continuing the same. He and his wife live in Midland, Texas. They have a 10 month old daughter who "has a vocabulary of eight words and still does not read." . . . **Dick Smith's** wife recently dropped me a note to say that her husband is Chief of the Outpatient Department at DeWitt Army Hospital, Fort Belvoir, Va. Dick is scheduled to leave the Army on March 1, 1968, and enter private practice in Hagerstown, Md. . . . **Jim McNeely** wrote recently that he is now Senior Research Engineer at Monsanto Company's Central Research Laboratories in Creve Coeur, Mo., and is responsible for the preparation of large single crystals of the third generation semiconductor, gallium arsenide. . . . **Pierre Cathou** has started an engineering contract personnel company in Cambridge. He reports that it is going slowly but surely. . . . **Bill Adam** is now in charge of the Providence Office of Peat, Marwick, Mitchell and Company. The paper from which I gleaned this news advises he joined

the family firm of Baker and Adam in 1959 and became a partner. With the company's merger with Peat, Marwick in 1963 he became partner in charge of that firm's Portland Office. Bill was a corporator of the Maine Savings Bank in Portland, active in the United Fund, a Director of the Portland Provident Association and a member of several other area organizations. . . . **Bill Brandon** wrote me a long letter recently. Bill is now with MITRE working on satellite communication projects. He reports that he hopes to do some weekend amateur archaeology work. He passed on the following information concerning classmates. "The John Deckers, '58, live in Concord in their new modern home. John is with Sperry Research working in plasma physics. . . . **Bob Batchelder** is a project engineer at Itek, Corporation. . . . **Darroll De Long** is with the radar research group at Lincoln Lab and lives in Acton. **Jay Hammerness** is a Assistant Dean of Students Affairs at M.I.T. . . . **Bob Green** is teaching in Course XV at M.I.T. while learning fine points of bridge from his daughter. . . . **Bill Fey** is working on communication projects at MITRE. . . . **Doug McIver** and **Allegra** live in Washington, D. C. Doug is with the Navy department's Special Projects Office." . . . One final note, **Henry Powicki** is working for Sylvania Electronics in Needham. He is married with two children. . . . See you in thirty days.—**Frederick L. Morefield**, Secretary, 18 Whaddon House, William Mews, London, S.W. 1. England

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10th Reunion; Provincetown Inn, Provincetown; June 7-10, 1968; for reservations: Michael E. Brose, 1171 North Street, Walpole, Mass.

David Baldwin is now an Assistant Professor at Yale University in the Department of Applied Science. . . . **Peter Brandt** has been working on the engineering staff at Sperry in Great Neck, L.I., since August '66. . . . **Mel Copen** writes from Houston where he is an Associate Professor in Production and Logistics Management and International Business at the University of Houston, College of Business Administration (you ought to see his Texas calling card—it's five inches wide). Mel and Linda moved to Houston after he received his D.B.A. from Harvard Business School. His doctoral dissertation was "The Management of U.S. Manufacturing Subsidiaries in a Developing Nation: India." . . . **Richard Dalven** is doing solid state research at the R.C.A. laboratories in Princeton, N.J. . . . **Ray Danon** is back in Boston and studying evenings at B.U. for his M.B.A. while working in the New England marketing group for a division of W. R. Grace. . . . A note from **William Hauke** who is "engaged in the construction business in Burlington, Vt., building shopping centers, low cost and vacation homes. Carole and I now

have three children, David, 5, Steven, 3, and Sandra, 1. Hope to see many classmates at our 10th Reunion." . . . **Edwin Lee** is Director of Project Engineering at Decision Control, Inc., in Newport Beach, Calif., where he is responsible for development of memory systems and circuit modules. Since graduation he has garnered about 10 patents in a wide range of computer systems. . . . **Michael Greenberg** has joined Bedford Associates as a senior electronic engineer. Previously he was with the data systems group at Laboratory for Electronics. . . . **Stanley Klein**, a former editor of *Engineer*, is now the Regional Editor of *Machine Design*, and located in New York. . . . **Daniel Raichel** was married last March to the former Geri Wahrman, a graduate of Brooklyn College and a recipient of a master's degree from Teachers College, Columbia University. They are living in New York.

Sander Weinreb is now head of the electronics division at National Radio Astronomy Observatory in Green Bank, W. Va. After receiving his Ph.D. in '63, he worked at Lincoln Laboratory for two years before taking his current post. . . . **Robert Ricci** has "returned to the Boston area after seven years with R.C.A. Laboratories in Princeton to join the computer display branch of the Guidance and Control Research Laboratory at N.A.S.A. E.R.C. in Cambridge. I am presently doing research in advanced memory techniques for spaceborne computers. In June, 1964, I married the former Elizabeth Grieder, a graduate of Douglass College." . . . Reunion time is rapidly approaching! Down at the Provincetown Inn our host, manager Chester Peck, is busy getting all his new facilities ready for us. Be sure to send in your reservations early—we hope to have as many rooms as possible with an ocean view. (A letter with the reservation reply form is on the way and you will receive it shortly if you haven't already. If you haven't been getting the notices, please write and send us your correct address.) Getting to the Provincetown Inn is very convenient, either by car or plane. From Logan Airport there are scheduled frequent flights direct to Provincetown via the Provincetown-Boston Airlines. And by car it is only a two-hour drive from downtown Boston. Plan now for a full weekend of relaxation and enjoyment with friends, old and new, on June 7-9. Swimming, tennis, golf, dunes rides, great food with your choice of lobster or beef at the Saturday night banquet, dancing and entertainment all make this a Reunion you just can't miss!—**Michael E. Brose**, Secretary and Reunion Chairman, 1171 North Street, Walpole, Mass.; **Antonia D. Schuman**, Western Associate, 2240 Napa Street, Canoga Park, Calif.

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Sue Schur has been elected Chairman of the Boston Section of the Society

of Women Engineers; Sue currently heads a technical advertising agency which operates under her name. . . . **Bob Hudock** presented (with his brother Philip, '62) a paper titled, "Systems Analysis Approach to Commuter Airline Planning" at the A.I.A.A. Fourth Annual Meeting and Technical Display in Anaheim, Calif., in October. . . . **Richard Dattner's** New York City apartment was featured in the New York *Times* last spring. He is an architect and has recently designed one of New York's "adventure playgrounds" commissioned by the Estée and Joseph Lauder Foundation; he researched and wrote the section of the *A.I.A. Guide to New York City* which deals with the neighborhood in which he and his wife live. . . . **George Papadopoulos** is the American Festival of Music Director; he is in concert production and, has been described by the *Herald Traveler* as "Boston's most respected impresario." . . . **Roy Upham** has been appointed Chief of the Division of Foods and Dairies of the Illinois Department of Public Health; he was previously at the Natick Army Laboratories in Massachusetts. . . . **Robert Barnes** has joined the Du Pont Company's Plastics Department, Research and Development Division, at the Experimental Station near Wilmington, Del. He received his doctorate in physics from the University of Wisconsin in 1967. . . . **Richard Bradt** has been named Assistant Professor of Ceramic Science at Pennsylvania State University; he was a research fellow at R.P.I. where he received his master's and Ph.D. degrees. From 1960 to 1963, he was a research metallurgist with the Fansteel Metallurgical Corporation in Chicago.

Lee Holmes is back at the Institute as a Sloan Fellow and expects to get an M.S. in Management in '68. At a recent Joint Air Force/Industry Cost Reduction Symposium and Awards Ceremony in Boston, he was presented an award by the Assistant Secretary of the Air Force for his cost savings accomplishment resulting in a saving of more than \$400,000. Before coming to the Sloan Fellowship program, Lee was Manager, Radar and Airborne Fire Control Systems, Systems Technology Department, General Dynamics Corporation. . . . The Alumni Association presented certificates of appreciation to **Al Krigman**, **Charles McCallum** and **Tom Farquhar** for their outstanding efforts on behalf of the 1967 Alumni Fund. Classmates who are Regional Chairmen for the 1968 fund are: **Steve Gill**, San Mateo, Calif.; **John Hughes, Jr.**, Wellesley, Mass.; **Charles McCallum**, Grand Rapids, Mich.; **Arthur Silverman**, Manhattan, N.Y.; **Cyril Pierce**, Dayton, Ohio. . . . **Barry Karger** had an article in the July 1967 issue of *Analytical Chemistry*; he is an Associate Professor of Chemistry at Northeastern University. . . . From **Jerald Rekosh**: "This should bring me up to date: Ph.D. in Psychology from Brandeis University in 1966, then a year postdoctoral at the Veteran's Administration Hospital in Boston and

now I'm Clinical Psychologist at Boston City Hospital and Research Associate at Harvard Medical School as well as having a few other odd jobs."

Gerald Levine, his wife Sharon, and their two-year old daughter, Robin, will be living in Kobe, Japan until March 1968. Jerry is supervising construction and start-up of a new chemical plant for Dai-Ichi General Ltd., a General Mills subsidiary. . . . From **Gerry Hurst** (honorable Class President): "Since moving to Philadelphia I've run into **Bob Keeney**, who works one floor below me at G.E., and substitutes at our noontime bridge sessions (he works in marketing in the Switchgear Department). I also ran into **Tom Stone** who is finishing his Ph.D. in Economics at Wharton." . . . **Stu Wilson** received his Ph.D. in E.E. at M.I.T. in June 1967, and is now doing research at Polaroid in Cambridge. . . . **John Meng** writes: "Fran and I have been in California nearly four years now. We are rearing three natives, Karen, Lisa, and Cecelia. I am working at U.C. Lawrence Radiation Lab in Berkeley." . . . **J. David Powell** is working on his Ph.D. in Aero and Astro at Stanford. **Richard Davidson** says: "Now have a son, Jim, 2½, and a daughter, Kim, 2 months. My wife Jean was a secretary at Cook Research Labs (Morton Grove, Ill.) where I was working when I met her. For the past four years I have been with Bell and Howell Company. Am now Manager—Planning and Administration for Technical Operations (new product function) in the photo products group. Also involved in some applied R. and D."

Lawrence Kravitz has returned from a tour in Korea; he is a Captain in the Army now and still single. He is at the ordnance career course at Aberdeen Proving Ground, Md. . . . **Mike Simkowitz** is on the faculty of Indiana University, Finance Department. He got his Ph.D. at N.Y.U. His wife is the former Joan Eggatz; they have two children: Daniel, born 3/65, and Carol, born 7/67. . . . **Calvin Hulstein** is working for Monsanto—Packaging Division. He is Group Leader with responsibility for research and P.V.C. blowmolding for bottles. He says he has settled and bought a home in Wapping, Conn. He has three children: Charles, 7, Cheryl, 6, and Caryn, 3. . . . That's quite a lot of news; to add yours simply write to—**Linda G. Sprague**, 345 Brookline Street, Cambridge, Mass. 02139

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Edward H. Feustel, who received his Ph.D. at Princeton about a year ago, and his M.S. in course VI-A in 1964, is now Assistant Professor of Computer Sciences, Department of Electrical Engineering at Rice University, Houston, Texas. . . . **George Meyer**, who is now Captain in the Air Force and stationed in northeastern Thailand writes that he was married last April in Elmira, N.Y., to the former Carolyn Edwards Garrett.

She is a nurse and is working in Bangkok. His address is Box 12, 432 U.S.A.F. Disp., A.P.O. S.F. 96237, and he is anxious for anyone in that area of the world to look him up. . . . **Ronald Troulman** has been on active duty for the past year with the Navy as Lieutenant working as a Scientific Officer for the contract research program in the Office of Naval Research. He has contacted many M.I.T. classmates during his visits to various universities around the country. . . . **John D. Cervenka**, who received his M.S. from U.C.L.A. in 1966, is studying medicine at University of Minnesota Medical School. . . . **Steve Smith** has been transferred to La Porte, Ind., by Whirlpool Corporation, where he is Manager of Labor Relations. . . . Recently named Placement Manager for Dow Chemical Company, Europe, and responsible for selection and placement of professional employees in Europe is **Carl A. Bauer, Jr.** He, his wife and three children have moved to Zurich, Switzerland. . . . **James B. Clifford, Jr.**, is living in Houston where he works for T.R.W. Systems. He is still single and running around in a new Pontiac Firebird. . . . **Thomas A. Layher** is now in Systems and Procedures, Ford Division of Ford Motor Company. He and his wife, Mary, had a son, Theodore Houghton, last July and have purchased a house in Ann Arbor, Mich. . . . **Loren C. Skinner, 2d**, received his Ph.D. in Metallurgy from M.I.T. in 1965 and has been working at Motorola in Phoenix in Integrated Circuits R. and D., since July '66. Shortly before receiving his degree he married a Tech alumna and their first child was born in April 1967. . . . **R. Brian Strong** is working for I.B.M. in Miami. . . . Enjay Chemical Company has announced the appointment of **David G. Corson** of Edison as Technical Sales Representative for the Paramins division. Corson will be responsible for the sales of Enjay's fuel oil and lubricant additives. He began his career after receiving his master's degree from Lehigh University in 1963. He has been in the company's additives laboratory and in the Paramins division as a financial analyst.

Philip Schmidt is now working for his Ph.D. in mechanical engineering at Stanford and expects to finish in summer of '68. He was married to the former Donna Packer of Palo Alto, Calif., in August of '66. She is a graduate of University of California, Berkeley. . . . **Harold Metcalf** completed his Ph.D. thesis in atomic physics at Brown University last June. He spent the month of July at the Latin American School of Physics in Santiago, Chile. He and his wife Marilyn visited Buenos Aires, Rio, and Brasilia on their way home. They have a son David, 3, and a girl Cynthia, born last October 12. Harold is currently doing postdoctoral research involving precision measurement of the fine structure constant at Brown University. . . . **Dr. Melvin Weiss** has just completed medical school at Downstate Medical Center and is now interning at Kings County Hospital in

Brooklyn. . . . **Bob Wilhelm** and Donna, who were married last October, are enjoying life in Bogota, Columbia. They write that they are living in a penthouse with a cineramic view of the 12,000 foot Andes Mountains and residential Bogota. Donna is busily working out formulas to convert recipes to the altitude. They discover new dishes all the time: custard pie soup, angel flatcake, and the seven-minute three-minute egg. On the other hand, they are happily enjoying low cost and readily available domestic help in the form of a maid and a chauffeur. Bob is managing a department of 11 people and is involved in supply planning and overall company economics at Esso. . . . On December 30, 1967, my wife Linda gave birth to a son, Andrew Steven, who weighed in at 8 lbs. 12 oz.—**Gerald L. Katell**, Secretary, 310 Hoge Building, Seattle, Wash. 98104

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5th Reunion; Harborside, Edgartown; June 7-10, 1968; for reservations: Peter T. Van Aken, 7 Hickory Lane, Belmont, Mass.

If you need any help with a computer program, **Richard Hull** has formed his own firm to do developmental work in computer software. He also plans to do some work in hardware. The firm is called Hull Associates. . . . **Dan Ross** writes that he is a Clerk with the Tax Court of the U.S. along with **Al Kamin**. This June, Dan expects to go into the Army. . . . At about that time, **Steve Ditmeyer** will be finishing up his Army tour of duty. He is currently stationed

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For details see page 120

at the Pentagon. . . . **Bob Turtz** is also in the Washington area. He is a lawyer with the A.E.C. . . . **Dale Meyer** is in D.C. with A.I.D. . . . **Michael Merel** is now in Los Angeles with T.R.W., working on guidance, navigation, and filtering theory. . . . **Dan Caldwell** is in the Army, assigned to the U.S.A. Regional Communications Group (RVN). He should be coming home in October '68. . . . **Phil Graham** writes that his wife Kathy had a baby boy, David Scott, last February. At that time Phil was in the Navy, assigned to the Air Turbine Test Station at Trenton, N.J. . . . **Charles Schumacher** is at Bell Labs as a Business Systems Supervisor engaged in O.R. work related to information systems.

John McNally is a chemist at Koppers in Monroeville, Pa. . . . **Frank Verlot** is working on a Ph.D., working for Lockheed Missiles and Space and spending his spare time on the State Central Committee of the California Republican Party. . . . **Paul Krehbiel** is pursuing thunderstorm and lightning research at N.M. Institute of Mining and Technology. . . . **Richard Herney** is with the Winters Foundry and Machine Company as Chief Engineer. . . . **Bob Morris** is a Ph.D. candidate in biochemistry at the University of Oregon. . . . **Joseph Wasserlein** is now out of the Army and back at Scott Paper in Holyoke, Mass., where he is Senior Engineer in charge of process and equipment development. . . . If you have any news, send it to—**Bob Johnson**, 209 E. 66th Street, New York, N.Y. 10021. And don't forget the Reunion!

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This month's column contains the last of the information from the questionnaires sent out last fall. For future issues, I will need to rely on your initiative in sending me news of yourself and our classmates, so please take a few minutes to jot me off a quick note. And now for this month's news. . . . **Arnold Aaron** is a Ph.D. candidate in biophysics at Northeastern University. . . . **Mark Ain** has attended the Sorbonne in Paris and received his M.B.A. in '66 at the University of Rochester. He is now working in New York City as a market representative for ESSO International. . . . **John Bailey** is working on his Ph.D. in math at the University of Tennessee, and is presently a research assistant there. He is engaged to Miss Eleanor Jones and plans to be married this September. . . . **Robert Beardsley** is finishing his thesis for his Ph.D. in oceanography at M.I.T., after which he will become an assistant professor of Physical Oceanography at Tech. His wife Susan watches after their one year old daughter. . . . **John Bennett** worked for a while as a civilian physicist for the Navy, and is now a teaching assistant and grad student at Purdue. . . . **Joe Boling** is a captain in the Army, now serving in Viet Nam. His wife Helen takes care of their one

year old daughter. . . . **Robert Brooks** is working for Raytheon and is taking courses at Northeastern for his M.S.E.E. His wife Carol is a social worker. He is also a deputy sheriff in Madison County, Huntsville, Alabama. . . . **T. N. Charchut** worked for Pratt and Whitney for 1½ years, and has since been at R.P.I. grad school. He expects to be in California soon.

George Chen is working on his Ph.D. in physics at Brown University. . . . **Ambrose Clay** is a program designer and systems analyst for an electronic telephone switching system. His wife Sharon is a secretary. . . . **Robert Clements** is one of two logic designers on the PDP-10 computer. . . . **Ernest Cohen** received his M.S. in instrumentation engineering at Case, and is now a systems research engineer for Foxboro Company in Foxboro, Mass. He also plays in two musical bands and sings in a church choir. . . . **Joe Coldwell** is working for the Smithsonian Astrophysical Observatory in Hawaii. His chief non-vocational interests are his librarian-wife Sheryl and surfing. . . . **Robert Colomb** worked in Dayton for two years for a military R. and D. firm, and is now manager of their New England branch in Lexington. The firm, Systems Research Labs, keeps him busy with applied math. . . . **Robert Covelli** received his S.M. at M.I.T. in 1966, and is now a programmer for Adams Associates. His wife Susan watches over their one year old son. . . . **J. I. Craig** is working on his Ph.D. in Aero and Astro at Stanford. His wife Nancy is a secretary and is expecting their first child at any time. . . . **John McCrickerd** is studying at Cal Tech. His wife Eileen is a nurse and mother of their one year old daughter. . . . **Douglas Currier** is an assistant professor at the Coast Guard Academy in New London, after receiving the Bronze Star for service in Viet Nam. His wife Anita keeps busy with their two children, ages 5 and 7.

Michel Delsol is close to receiving his Ph.D. in metallurgy at M.I.T. His wife Cheslye is a teacher. . . . **Joe Domine** is working for Union Carbide in R. and D., and is studying for his M.S. at Stevens Institute of Technology. His wife Caroline is a secretary. . . . **Bill Dreiss** received his M.B.A. at Harvard Business School and is now a systems analyst for United Aircraft Corporation. Surfing and rugby are his favorite activities. . . . **David Dunford** received his M.A. in Political Science at Stanford, and is now in the Foreign Service. His present post is with the American Embassy in Quito, Ecuador. His wife Sandra is expecting their first child. . . . **Engin Ekonom** received his M.S.E.E. from Berkeley in 1965, and is now working as an engineer at a nuclear research training center in Istanbul, Turkey. Engin practices karate, while his wife Carol is the prime defender of their one year old son. . . . **A. W. England** is completing his Ph.D. at M.I.T., and is presently a scientist-astronaut for

N.A.S.A. His wife Kathleen is a speech pathologist. . . . **Lee Erlebach** is presently working on his Ph.D. out in Seattle. . . . **J. W. Giffin** received his S.M. at M.I.T. and his M.B.A. at Harvard Business School. He is now an engineer for Westinghouse in Leesburg, Va. His wife Jacqueline is a teacher. . . . **Conrad Grundlehner** is working on his Ph.D. in applied economics at Penn. His chief interests are his M.G., the stock market, girls, and photography (not necessarily in that order). . . . **Dan Gulman** is working on his Ph.D. at the University of Illinois, and clearly indicates that girls are his chief outside interest.

Barry Hancock is working on his M.A. in Biblical Education at Columbia Bible College in South Carolina, after working a couple of years in electronics. . . . **George Harlem** is a circuit designer for Itek Corporation, and is taking night courses at Northeastern. His wife Rosina is expecting their first child in April. . . . **Lansing Hatfield** is an instructor in E.E. at M.I.T., and is working on his Ph.D. concurrently. . . . **Antony Heatwole** works for Bell Telephone Labs and attends the University of Pennsylvania part-time. . . . **Richard Hodges** is in operations research for General Dynamics in Groton, Conn., after three years at Boston University. . . . **David Hoover** is close to a degree in Urban Planning from New York University, and is now back at M.I.T. in the Sloan School. . . . **Bruce Hopkins** worked two years for Kodak, and is now designing medical equipment for Ritter Equipment Company in Rochester. His wife Marion keeps house for their two year old son. . . . **Joel Kalman** is enjoying a bachelor's life in California while working in the Telecommunications Division of the Jet Propulsion Lab. He made straight A's his last semester at Berkeley, after which he received his M.S.E.E. . . . **Bruce Knobe** is a research assistant and Ph.D. candidate at New York University. He received his M.S. at the University of Illinois. . . . **Larry Langdon** is working on his Ph.D. at M.I.T. in math. His wife Charlotte is a high school teacher. . . . **Donald Levy** is in the Ph.D. program at Columbia in industrial management. . . . **Warren Littlefield** received his M.S. at Stanford, and now he and his wife Marjorie are in the Peace Corps in Quito, Ecuador. He teaches transistor theory there.

John Ludutsky received his M.B.A. from Harvard Business School in 1966, and is now national account manager for Industrial Nucleonics Corporation. He is based in New York City but travels over the U.S. . . . **Gary Lukis** has been at Stanford since graduation, first studying aero and astro, but now a second year medical student. He has spent time mountaineering in the northwest, and claims a 10 per cent increase in hair (a beard). . . . **Lita Markley** (now the wife of M.I.T. Professor Donald Nelsen) received her S.M. from M.I.T. in 1966, and is now a research engineer for Amicon Corporation.

Last summer she went vacationing in the Yukon. . . . **Duncan McCornock** received his M.S. from Clark University in Worcester, Mass., and is now working toward his Ph.D. at the University of Southern California. He is also working as a programmer-analyst for the Jet Propulsion Lab. His wife Gari-Jo is a student at University of Southern California and the mother of their one year old daughter. . . . **R. W. McEntire** is closing in on his Ph.D. in physics at the University of Minnesota. His wife Robin is also studying for a Ph.D. there in psychology. He notes that surviving the Minnesota winters is one of his most arduous activities. . . . **Henry Modetz** is a Marine Corps officer and enjoys mountain climbing. . . . **James Monk** has been working for Goodyear International since graduation but was drafted on December 4, and is possibly headed for you-know-where. . . . **Michael Monsler** expects his Ph.D. this year from M.I.T. in high temperature gasdynamics. His wife Barbara is a computer systems consultant. He notes that M.I.T. is a fantastic place to get an education—but a life sentence is ridiculous!

Bernard Morris is working toward his Ph.D. in physics at Brown University. His wife Anne is a librarian. . . . **Mike Morrissey** is a systems engineer for I.B.M. His wife Beryl tends to the household and their one year old daughter. . . . **Bill Nelson** is a project engineer for Johnson and Johnson and is pursuing his M.B.A. at Rider College. His wife Joyce is a registered nurse and mother of their four year old son. Bill notes that surviving unharmed from a V.W. wreck where he was hit in the head with his own bowling ball has changed his whole outlook on life—he has given up bowling. . . . **G. B. Nelson** received his M.B.A. at Stanford in 1966, and is now market analyst manager at Cummins Engine Company. His wife Chris takes care of their one year old son. . . . **Richard Nixon** received his S.M.E.E. at M.I.T. and is now a project engineer for Adage, Inc., in Boston. His wife Nancy is the mother of their one year old daughter. . . . **Russell Norris** spent one year in E. E. at the University of Illinois, and then switched to the Lutheran School of Theology in Chicago. He is presently an intern pastor, with a sideline as a semi-professional guitar player. . . . **Robert Park** is a grad student at Tufts in biology, and his wife Constance a grad student at Harvard. Robert is active in New Left politics. . . . **David Perkins** is a Ph.D. candidate in math at M.I.T. His wife Ann is a Ph.D. candidate in Slavic literature at Harvard. . . . **Charles Phillips** is working for Globe Exploration Company, a Texas petroleum firm. His wife Leslie cares for their two children, ages one and four. . . . **G. Piotrowski** received his S.M. at M.I.T. in 1965, and is now a Ph.D. candidate at Western Reserve. His wife Linda is a teacher.

Stephen Portnoy is working on his Ph.D. in math at Stanford. His wife Esther is also a Ph.D. candidate in math there.

. . . **John Prather** was in grad school for two years at the University of Indiana, and is now working in the engineering department of R.C.A. His wife Carolyn is a registered nurse. . . . **Allen Press** is working on his Ph.D. in psychology at Clark University, and is a computer programmer there. . . . **John Prokopy** received his M.S. in civil engineering from M.I.T. and is still there doing research. His wife Patricia is a physical therapist. . . . **Thomas Provost** is a grad student at M.I.T. and works there as a programmer. His wife Gloria takes care of their two daughters, ages one and under. Tom notes that Boston politics is a good excuse for promoting benevolent dictatorship. . . . **John Rainier** is expecting his Ph.D. in Civil Engineering at M.I.T. this year, and is active in musical activities. His wife Nancy works for Graphic Arts. . . . **Ron Randall** received his M.B.A. in 1966 from Harvard Business School, and is now a 1st Lieutenant in the Army working on a computer-assisted instruction project. . . . **William Rentz** is working toward a Ph.D. in economics at the University of Rochester, and spent this last summer doing programming for Xerox. . . . **Tiina Repnau** is a programmer for the Rand Corporation and is working toward a M.S. at San Fernando State. Her activities range from choral singing to skiing to basket weaving. **Richard Reznik** is a Ph.D. candidate in polymer science at Western Reserve, and figure skates for exercise. . . . **Britten Richards** is working on his Ph.D. in transportation at the University of Indiana and is teaching there. His wife Caroline is also teaching. . . . **Peter Robb** received his M.S. in engineering management from Northeastern in 1967, and is now manager of operations research for the paper and film division of Olin Mathieson. His wife Ann watches over their three children, ages 6, 4, and 8 months. . . . **Steven Roberts** is doing R. and D. for Motorola, and taking courses for his M.S. His wife Carol is busy taking care of their six month old daughter. . . . **William Roberts** is working on his Ph.D. in math at M.I.T. His wife Linda is a researcher at Arthur D. Little Company. . . . **Anthony Robinson** is in his last year at New York University Medical School and spent last summer in South America. . . . **James Rome** is working on his Ph.D. in E.E. at M.I.T. and is teaching there. . . . **Marcia Root** received her S.M. at M.I.T. in 1966, and is now working for the Massachusetts Department of Public Health in pollution control. She is also the mother of a two year old son.

Allison Russell is working on his Ph.D. in physics at the University of Illinois. His wife Georgia became the mother of their son last October. . . . **David Saarela** is a captain in the Marines and is ending a tour in Viet Nam as a bombardier-navigator. His wife Carol is a teacher. . . . **Paul Santos** is in the Ph.D. program at Berkeley in E.E. His activities beyond school include sports car racing and judo. . . . **Paul Sapounakis**

is working as a real estate consultant and developer, and recently opened a Greek restaurant called "Piraeus My Love." His wife's name is Valery. . . . **Dave Saul** received his S.M. at M.I.T. in 1965 and has since been with I.B.M. as a systems engineer. His wife Susan holds the same job classification. . . . **John Van Saun** is working on his Ph.D. in metallurgy at Carnegie, while his wife Carolyn is a Ph.D. candidate in chemistry at the University of Pittsburgh. . . . **George Schmidt** is on the staff of the M.I.T. Instrumentation Lab and is working on his Ph.D. there. He also teaches at Boston University. His wife Sylvia is a teacher and the mother of a new-born son. . . . **Robert Scott** is assistant to the Dean of English at M.I.T., and his wife Sherry, skiing, and travel occupy the remainder of his time. . . . **William Shack** is working toward his Ph.D. at Berkeley. . . . **Shang-Tah Shih** is in grad school at Harvard. . . . **Ed Shibata** is closing in on his Ph.D. in physics at M.I.T. He lists as his major achievement staying single while steadily marrying off roommates. . . . **Maury Shulman** received his M.S. in management from M.I.T. and is now a systems engineer at I.B.M. Maury notes that "1700 is too damn much," but he can be consoled with the fact that M.I.T. recently announced that the tuition next fall will be \$2150. . . . **Donald Silversmith** is working on his Ph.D. in material science at M.I.T., after receiving his M.S. from the University of Florida. . . . **Fred Silverstein** is now a 2d Lieutenant in the Air Force and is stationed at Hanscom Field near Boston. . . . **Michael Simpson** is a project engineer for the Pennsylvania Power and Light Company. His wife Sharon watches over their daughter and son, ages 3 and 4 months. . . . **Kim Sloat** has spent the last three years working for Delta Upsilon, studying at a theological seminary, and working for Hughes Aircraft. His present job is with Hughes, and he is working on a M.S. at U.C.L.A. Business School. . . . **Arthur Smith** received his M.S.E.E. at M.I.T. in 1966, and is now working for M.I.T.R.E. Corporation. . . . **Dean Smith** is working on his Ph.D. in astro at Stanford. His wife Zdenka is also a scientist. . . . **Alfred Stella** is a marketing consultant in a two man partnership specializing in advanced technologies. He is writing a novel entitled *We the Maladjusted*. His wife Charlotte is a secretary.

Glenn Stith is living in Tulsa, keeping busy with computer work, studying, and basketball. His wife Suzan works for an insurance company. Glenn notes that hippies are nothing new to a former East Campus resident. . . . **Michael Stulberg** is in his third year of medical school at Harvard, after taking one year out to do research, for which he received an award. His wife Barbara is a medical secretary. . . . **Leonard Theran** received his M.B.A. at Stanford, and is now an applications engineer for Teradyne Corporation in Boston. He holds a private pilot's license and is active

in politics in Brookline. . . . **John Timoshenko** received his M.S. in mechanics from the University of Connecticut, and is presently working for Pratt and Whitney and taking courses toward a Ph.D. His wife Beverley is a secretary. . . . **Richard Townsend** received his M.S. at M.I.T. in 1965, and is now a Ph.D. candidate at Stanford. His wife's name is Laurel. . . . **Douglas Tuggle** is now on sabbatical from Carnegie, where he is working on his Ph.D. in organization theory, to work for the R.A.N.D. Corporation. His wife Mary Ann is a registered nurse. . . . **Douglas Veenstra** received his M.S. at Purdue in 1966, and is now a project engineer for General Motors in the auto safety field. . . . **Bob Wisleder** is a project engineer for Ditrin Corporation, a subsidiary of Litton Industries, that designs and builds computers for military use. Bob is probably the top contender for the classmate who graduated single and now has the most children—he and his wife Jane have three. . . . **Mike Wolfson** spent two years in grad school at the University of Kansas, and is now an aircraft controller for the Air Defense Command.

Al Zobrist received his M.S. in math at the University of Wisconsin, and is now working on his Ph.D. there. He spent one year as a programmer for Aerospace Corp. His wife Pamela is a secretary. . . . And that's the news for now. Next month's column should be much less a strain on fingers weary with typewriteritis, but please write so that they won't be entirely laid off.—**Ron Gilman**, 1021 Oakmont Place, Apt. 8, Memphis, Tenn. 38107

66

As the cold weather really begins to take hold the responses to this column seem a little frigid as of late. Please take a moment to send me some news so that next month's report will be longer than this one. . . . **Harry Moser** has married Barbara Tomkinson and is now working for General Electric on man-

ufacturing management programs. . . . **Bert Forbes** married Candee Templeton of Jackson College on July 1, 1967. They are now residing in Palo Alto, Calif., where Candee is attending Stanford; Bert is employed by Hewlett Packard Corporation, while continuing his work toward an Engineer Degree at Stanford. . . . **Martin Krove** is attending grad school at Princeton in Electrical Engineering. . . . **Alan Fener** will graduate from Northeastern University in June with a Masters in E.E. . . . **Mark Schwartz** is continuing his graduate work in chemistry at the University of Indiana. . . . **Norman Smith** has left Owens-Illinois, Inc., where he had been an industrial engineer for 15 months, and has begun work on an M.B.A. at Columbia. His major interest is production management; he is also serving as a teaching assistant in a computer course for entering M.B.A. candidates.

Michael Adler will be completing the M.B.A. program at Columbia this June; Mike is engaged to Marcia Pearl, a senior at Barnard College, and a late summer wedding is planned. . . . **Paul Aita** is in his second year at Gordon Divinity school, working toward a Master of Divinity degree, and is serving as a teaching fellow this year in New Testament Greek. Paul reports that he is engaged to be married to a former pupil of his, Gail Mugford of Chelsea, Mass., on June 29, 1968. . . . **Joseph Shaffery** is serving as a teaching assistant at Boston University and will be completing his requirements for an M.B.A. degree in June, at which time he and his wife are expecting their first child. . . . That's all the news on hand now. For those of you who may be passing through North Carolina on a trip to Florida for a spring vacation, please feel free to contact my wife and me here in Chapel Hill as we love to show off this part of the country. Of course, it is always great to chat with any fellow classmates about Tech.—**Gene Sherman**, Secretary, 74 Willow Terrace Apts., Chapel Hill, N. C. 27514

Course Review

V

Frank K. Pittman, B. E. Chemical Engineering 1936, M.S. Physical Chemistry 1937—both at Vanderbilt University—Ph.D. in Inorganic Chemistry, M.I.T. 1941, has joined the Kerr-McGee Corporation as Manager of Nuclear Marketing and will be located in Oklahoma City. Frank has been with the Atomic Energy Commission, Washington, D.C., for many years and has received many honors and awards for his work with that agency. In 1952 he was in charge of procurement and later promoted to director of the Division of Reactor Development. In 1960 he was named by the National Civil Service League as one of the top 10 career men in the Federal Government and in 1965 was given the A.E.C. Distinguished Service Award. . . . Other M.I.T. chemists associated with the Atomic Energy Commission, as a result of their work on a confidential project at M.I.T. during World War II, headed by Professor **George Marvin**, and **Allen J. Vander Weyden**, Jr., A.B., Colorado College 1940, Ph.D. M.I.T. 1943, and **George Kavanagh**, Ph.D. M.I.T. 1949. Dr. Vander Weyden was awarded the distinguished service citation of the A.E.C. in 1966. Dr. Kavanagh held the position of Deputy Assistant General Manager for Research and Development in 1964. Dr. Marvin resigned his associate professorship at M.I.T. in 1948 to join the A.E.C. and retired from the Commission in 1959. He moved to Fort Myers, Fla., where he applies his green thumb to exotic flowers, shrubs and fruit trees for distribution to all comers on a give-away basis.

Edward R. Kane, S. B. Union College 1940, Ph.D. M.I.T. 1943 in physical chemistry, has been named General Manager of DuPont's Industrial Biochemical Department. Dr. Kane joined DuPont in 1943, served as a chemist in the Nylon Research Section in the Experimental Station, was promoted to Research Supervisor in 1947, and transferred to the Seaford, Del., Nylon plant as manufacturing supervisor in 1949. He was also assigned to the Chattanooga, Tenn., Nylon plant, to the Kingston, N. C., Dacron Polyester Fiber Research Laboratory in 1954, and in 1959 appointed Director of the Nylon Technical Division. He became Assistant General Director in the Technical Division of the Textile Fiber Department in 1963 and was promoted to his present position in late 1966. . . . **Lederle Laboratories**, a division of American Cyanamid Company, Pearl River, N. Y., has announced the appointment of **Mary Gertrude Howell** (B. S. University of Illinois 1954, Ph.D. M.I.T. 1959) as head



Stanley I. Buchen, '52 (left), Associate Professor of Business Administration at Harvard, is a principal participant in the Harvard Business School's development of computation facilities and programs in support of work

in managerial economics. Five computers are now involved—I.B.M. 7094 and 1401, G.E. (time sharing), and S.D.S. 940 (time sharing). (Photo: Harvard Business School)

of the Literature Service Department. Mary joined Lederle in 1959 and has been a senior research literature chemist. The department is responsible for providing the Lederle research staff and management with information from the literature covering both the scientific and commercial aspects of the pharmaceutical industry. . . . **Charles Howell**, also B. S. University of Illinois, Ph.D. M.I.T. 1958, is with Rohm and Haas. On completion of his requirements for the doctorate he was awarded a Fulbright Fellowship and attended the Australian National University at Canberra where he held a post-doctorate appointment for one year. At M.I.T. his work was supervised by the late Arthur C. Cope. Mrs. Howell worked under the direction of Dr. John C. Sheehan. In Australia he was associated with Dr. Adrian Albert of the John Curtin School of Medical Research.

Malcolm Chamberlain, B.S. Bowdoin College, Ph.D. in organic chemistry M.I.T. 1951, has been appointed Administrative Assistant to the Director of Human Health Research and Development for the Bio-products Department of The Dow Chemical Company Laboratories located at Zionsville, Ind. Transferring from Midland, Mich., Dr. Chamberlain joined Dow in 1951 as a chemist in the Cellulose Products Laboratory, became assistant director in 1956, and transferred to the staff of the Dow Executive Research Department in 1961. His new assignment is for a two-year term then he expects to return to Midland. . . . **Martin Grisar**, with a diploma in chemistry—equivalent to an M.A.—from the Swiss Federal Institute of Technology, Zurich, Switzerland 1954, Ph.D. M.I.T. 1959, has been promoted to head of the Medicinal Chemical Research Division of the William S. Merrill Company, Cincinnati, Ohio. He joined the company in 1963. Previous employment was with Charles Pfizer and Company, Inc., of Groton, Conn. He was a student of the late Arthur C. Cope, head of the Department of Chemistry, M.I.T. In his new position he will be responsible for the development and coordination of medicinal chemical research on programs with biochemical emphasis.

Rohm and Haas Company has announced the transfer of **Richard F. Merritt** (A.B. Bowdoin College 1956, Ph.D. M.I.T. 1962) from the Redstone Research Laboratories, Huntsville, Ala., to the Spring House Laboratories, Pennsylvania. He joined Rohm and Haas in Huntsville in 1962, and his research was in the field of high energy compounds for rocket propellants. In his new assignment he will be concerned with the exploratory organic synthesis of compounds for use in acrylic dispersions. He, his wife, and three children live at 18 Shelly Lane, Fort Washington, Pa. At M.I.T. Dick's research was under the direction of Dr. Frederick D. Greene. He was awarded a National Institutes of Health Fellowship which he held for two years (2/60-1/62). . . . **Michael A. De Sesa**, B. S. Boston College 1949, Ph.D. M.I.T. 1953, now at the Research and Advanced Division of

the Avco Corporation at Lowell, Mass., has been elected President of the Analytical Division of the Northeastern Section of the American Chemical Society. . . . **Mario Banus**, Ph.D. in September 1949, now at Lincoln Laboratory, has been elected Chairman of the local section of The Electrochemical Society.—**Leicester F. Hamilton**, Correspondent, M.I.T. 4-254, Cambridge, Mass. 02139

VI

Thomas P. Cheatham, Jr., S.M.'47, Sc.D. '52, has been made Vice President in charge of systems and research for Grumman Aircraft Engineering Corporation, according to *The Long Island Daily Review*. His most recent former position was deputy director for tactical warfare programs in the Defense Department's Office of Defense Research and Engineering. Earlier he held high executive positions with Litton Industries and Melpar, Inc. In 1966 he was awarded the Defense Department Medal for Distinguished Public Service. . . . **Ronald E. Scott**, Sc.D.'50, has an exciting assignment in Dhahran, Saudi Arabia. His marriage to Maria Nunez in Miami, Fla., on August 12, 1967 was followed by about a month of travel in Europe and Lebanon en route to their new well-equipped and air-conditioned home in the compound of The College of Petroleum and Minerals, Dhahvan, Saudi Arabia. Quoting from Dr. Scott's Christmas letter: "The College of Petroleum and Minerals is currently operating a three-year program, consisting of an orientation year in which the students polish up their English, Math, Physics, and Chemistry, and a two-year Junior College which is equivalent to the first two years of an engineering program in the U.S.A. At the present time the students are sent to the U.S.A. after this program, and they have three years to finish their degrees. It will be my job to start the upper three years of the engineering program here, and also to start a complete four-year applied engineering program. This program will resemble the four-year technical institutes back in the U.S.A., but here at least it is essential for them to give a bachelor's degree. Education is completely subsidized and the students are even paid to go to school. There are only about 600 high school science graduates each year in the whole country and they are pretty choosy about what schools they will attend, or what foreign scholarships they will accept! We expect to sign the contract this week for the first phase of a new \$51 million campus, which will be the pride of the Middle East. The present quarters are already a little cramped." Dr. Scott was, until recently, Dean of Engineering at Northeastern University in Boston.

Robert Price, Sc.D.'53, is currently Head of Systems Studies at the Sperry Rand Research Center in Sudbury, Mass., where he guides research in underwater communications, sonar, radar, numerical techniques and applications, and other systems areas. Until 1965 he was at the

M.I.T. Lincoln Laboratory, where he and his classmate, **Paul E. Green, Jr.**, Sc.D. '53, pioneered in the field of radar astronomy. In this endeavor, a powerful coded-continuous-wave signal that may be sent from the Earth to Venus, for example, will be returned deeply submerged in noise and severely distorted by time-spread and Doppler effects. Dr. Price contributed significantly to the analysis and processing of the weak, multipath-reflected signal in order to extract from it the maximum information. In recognition of their outstanding contributions to radar astronomy, Doctors Price and Green were made Fellows of the I.E.E.E. in 1962. Earlier they had jointly conceived the Rake anti-multipath communications technique, for which M.I.T. has been granted a patent. Following his doctoral studies, Dr. Price worked in radio astronomy for nine months at Sydney, Australia, under a Fulbright Fellowship. He lectured in statistical communications at the University of California (Berkeley) during 1962-63. . . . **W. Howard Card**, S.M.'55, wrote us a newsy Christmas letter, which we are happy to publish except for minor editorial changes: "Dear Professor Wildes: The other night your name came up in conversation, so I thought I would send you a short note about some of the boys you used to know. Actually it was **Earl Kleitsky**, S.M.'53, who mentioned your name. He had been to visit M.I.T. and had met you. Other people present were **Raj Nanavati**, S.M.'53, and **Cyrus Oscar Harbourn**, S.M.'55. Three of us, Earl, Raj and myself, all came to Syracuse University in the late '50's and all got our Ph.D.'s here and all stayed on. We are now, all three, Associate Professors. Raj has been working in semiconductors—wrote a book on the subject—and is now concerned with some medical-type problems—or perhaps I should say biological problems. Earl is Assistant Director of our Laboratory for Sensory Communication. This Laboratory has been doing some really good work on the mechanics of the ear system. They have broadened out from this base, and have a graduate program too. For my own part I have been working on electrical noise a little bit, and am now getting into thin-film electronics. Our old buddy **Cyrus Harbourn** (we knew him as **Oscar** in those M.I.T. days) left here with his Ph.D. in 1961 or thereabouts. He was recruited by **Bill Youngblood**, Sc.D.'58, to go to Texas. From last July, Cy (as he was known here at Syracuse) has been Department Chairman of E.E. at Missouri (Columbia). He is a very good man and we are happy to see a guy we like so well get along. The reason all of us went to Syracuse was, of course, that our old teacher and friend **Tom Jones**, Sc.D., '52, told us it was a good place to go. Besides us, as Jones boys direct from M.I.T., we have here at Syracuse three Ph.D.'s from Purdue. One of them—**Don Weiner**, S.M.'58, E.E. '60—also was at M.I.T. There may be a certain amount of Tom Jones influence around here!!! Yesterday I got a letter from **Ken Watson** (another Jones boy) who after his S.M. at M.I.T.'55, went to the West Coast,

back to Oklahoma, then to Rice for his Ph.D. Now he is at University of Florida, Gainesville, working in magnetic thin films. On Thanksgiving week-end I was up to Toronto and dropped by the University to see old friends. **Jim Ham**, Sc.D. '52, is Dean there, of course, and of course everyone thinks so highly of Jim. He had left M.I.T. before I arrived but I knew him when I taught at Toronto, 1955-58. Some others of our vintage are still about. **Phil Lewis**, S.M. '54, Sc.D. '56, gave a seminar here a year or so ago. When last I heard, **Jim Ewing**, S.M. '54, was still connected with Toledo, but on leave to get his Ph.D. somewhere else. **Myron Marsh**, S.M. '54, works for Westinghouse, married a charming German girl, and flew into Syracuse a few years back, in his own airplane. I often recall with very great pleasure having dinner with you in the Graduate House. I can still picture Professor Ashdown presiding at his special place. Those were very happy years—those years at M.I.T., and I am grateful to you for your part in making them happy and rewarding. Very warmest regards and Season's Greetings."

The Institute of Electrical and Electronics Engineers has published its list of Fellows effective January 1, 1968. The grade of Fellow is awarded only by invitation as a hallmark of unusual distinction for extraordinary qualifications in particular fields. New Course VI Fellows are: Professor **Jose B. Cruz**, S.M. '56 (Circuit theory and sensitivity analysis of control systems), Professor **Robert G. Gallager**, S.M. '57, Sc.D. '60 (information theory and error correcting codes), **Charles W. Hargens**, 3d, S.B. '41 (Application of electronics to bio-medical instrumentation), Professor **William K. Linvill**, Sc.D. '49 (Sampled-data and computer control systems, and systems analysis techniques), **James R. Rae**, S.M. '29 (Improvement and expansion of world-wide communication services), and **John E. Ward**, S.M. '47 (Computer controlled systems). The president of I.E.E.E. will recognize the awards at the annual banquet in New York, March 20, 1968. . . . **Charles F. Hobbs**, S.M. '48, is Chief of the Information Branch of Data Sciences Laboratory, Air Force Cambridge Research Laboratories at L. G. Hanscom Field, Bedford, Mass. He has invented a simplified decoder for cyclic error-correcting codes. . . . **Joseph K. Dillard**, S.M. '50, has been made Manager, Advanced Systems Technology, at Westinghouse Electric Corporation, East Pittsburgh, Pa.—**Karl L. Wildes**, Correspondent, Room 4-232, M.I.T., Cambridge, Mass. 02139

SPECIAL REDUCED RATES FOR M.I.T. ALUMNI FOURTH ANNUAL TOUR PROGRAM-1968



These tours are based on special reduced air fares which offer savings of hundreds of dollars on air travel. For example, the tour to India is based on a special fare, available only to groups and only in conjunction with a tour, which is almost \$400 less than the regular air fare. Special rates have also been obtained from hotels and sightseeing companies. Air travel is on regularly scheduled jet flights of major airlines such as Japan Air Lines and B.O.A.C.

The tour program covers two areas—the Orient and India—where those who might otherwise prefer to travel independently will find it advantageous to travel with a group. The itineraries have been carefully constructed to combine the freedom of individual travel with the convenience and savings of group travel. There is an avoidance of unnecessary regimentation and an emphasis on leisure time, while a comprehensive program of sightseeing ensures a visit to all major points of interest. Hotel reservations are made as much as a year and a half in advance to ensure the finest in accommodations.

In past years, separate tours have been offered for Harvard and Yale alumni. Air fare regulations for 1968 will permit intermingling of alumni on any tour, and the full program is being offered to alumni of Harvard, Yale, Princeton and M.I.T., making possible a wider choice of departure dates.

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Jun. 29-Jul. 28

Sept. 21-Oct. 20

The fourth consecutive year of operation for this fine tour, which offers the true highlights of the Orient at a sensible and realistic pace. Eleven days will be spent in JAPAN, divided between TOKYO, the ancient "classical" city of KYOTO, and the FUJI-HAKONE NATIONAL PARK. Five days will be spent in HONG KONG and four in the fascinating city of BANGKOK. Shorter visits to SINGAPORE and the lovely island of FORMOSA complete the itinerary. Optional pre and post tour stops may be made in Honolulu and the West coast at no additional air fare.

A complete program of sightseeing will include all major points of scenic, cultural and historic interest. Among the many features will be: a tour of the canals and floating markets of Bangkok with breakfast at a waterside restaurant; an authentic Javanese "Rijsttafel" in Singapore; a launch tour of Hong Kong harbor at sunset, with dinner at a floating restaurant; visits to the Toroko Gorge and the new National Palace Museum in Taipei; a trip on the ultra-modern 125 m.p.h. express train in Japan,

as well as comprehensive tours of the cultural treasures of Kyoto, full day excursions to Nara and Nikko, and other programs, all fully described in the tour brochure.

Tour dates have been chosen to coincide with special seasonal attractions in Japan: the spring cherry blossoms and beautiful autumn leaves (Tours 1 and 3) and the famous Gion Festival in Kyoto, probably the most colorful and historic pageant in the Orient (Tour 2). Total cost is \$1499 from California, \$1699 from Chicago, \$1737 from New York and \$1747 from Boston.*

INDIA

Including NEPAL and PERSIA

29 DAYS \$1549

Oct. 5-Nov. 2

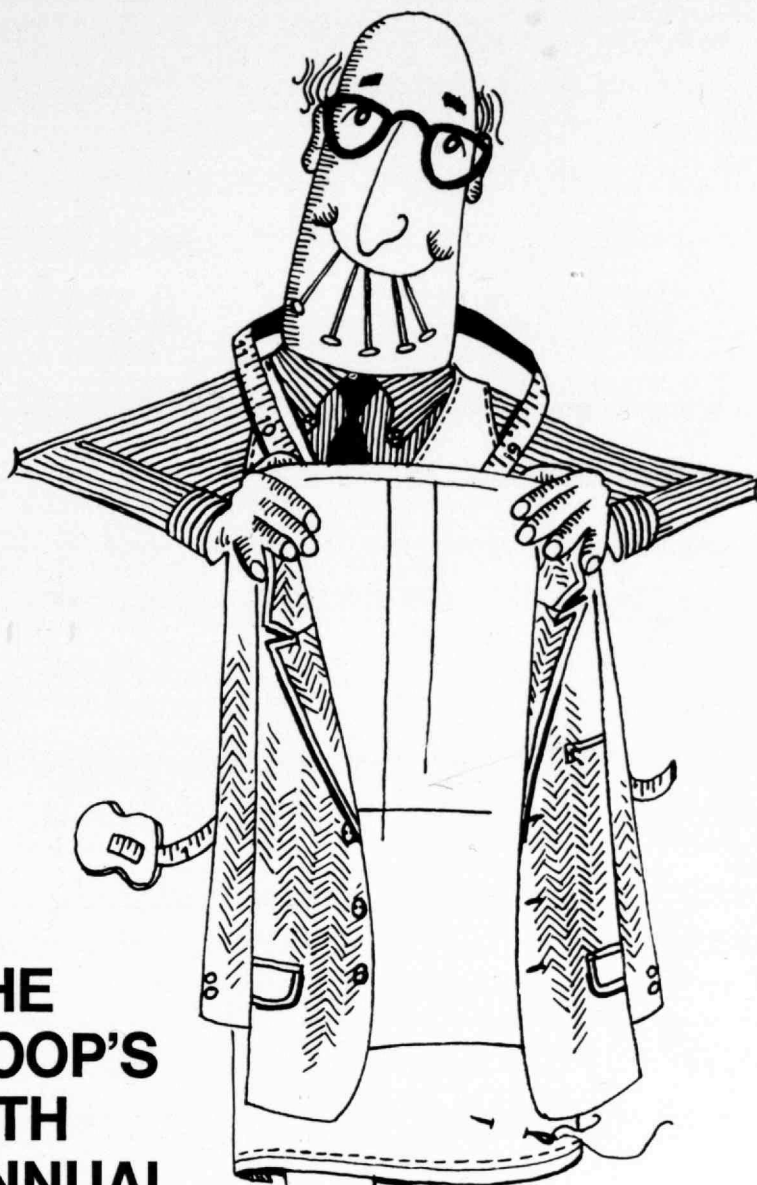
This tour presents an unusual opportunity to see the splendidly diverse and fascinating subcontinent of India, together with the once-forbidden kingdom of Nepal and the rarely-seen splendors of ancient and medieval Persia. Here is India from the mighty Himalayas to the palm-fringed Bay of Bengal: BOMBAY, the great seaport and traditional "gateway to India"; the magnificent cave temples of AJANTA and ELLORA, whose thousand year old frescoes are among the outstanding achievements of Indian art; MADRAS, in the south, closely associated with Elihu Yale; the great industrial city of CALCUTTA; then a thrilling flight into the Himalayas to KATHMANDU, capital of the kingdom of NEPAL, where ancient palaces and temples abound in a land still relatively untouched by modern civilization; the holy city of BENARES on the sacred river Ganges; AGRA, with time to see not only the Taj Mahal but many other celebrated monuments of the Moghul period such as the great Agra Fort and the fabulous deserted city of Fatehpur Sikri; the walled "pink city" of JAIPUR and nearby Amber Fort; the unique hill city of UDAIPUR, noted for scenic lakes, gardens, and delicate white marble palaces; NEW DELHI, the great capital of the nation; followed by a restful stay in the fabled beauty of the VALE OF KASHMIR, surrounded by the snow-clad Himalayas. After India comes exotic PERSIA (Iran): hundreds of miles to the south of Teheran lie PERSEPOLIS, the great royal capital of Darius and Xerxes in the 5th century B.C.; and ISFAHAN, the fabled capital of Persia in the 15th-17th century Renaissance, with its palaces, gardens, bazaar, and justly famous tiled mosques.

Transportation is by air, motorcoach, motorlaunch and elephant. Outstanding accommodations include luxurious houseboats on Dal Lake in Kashmir and hotels that once were palaces of Maharajas. Total cost is \$1549 from New York.*

*Special rates from other cities. Tour cost includes:

Jet Air, Deluxe Hotels, Meals, Sightseeing, Transfers, Tips and Taxes.

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You save \$35.00 to \$50.00 on every "Made-To-Measure" suit you buy.

All "Made-To-Measure" suits are made to your specifications, in your choice of luxurious imported worsteds, chevots, flannels, lightweight Dacron® polyester and wool blends.

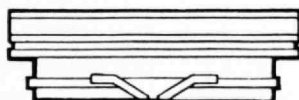
SPORT COATS . . . \$75.00, REGULARLY \$85.00 and \$90.00.

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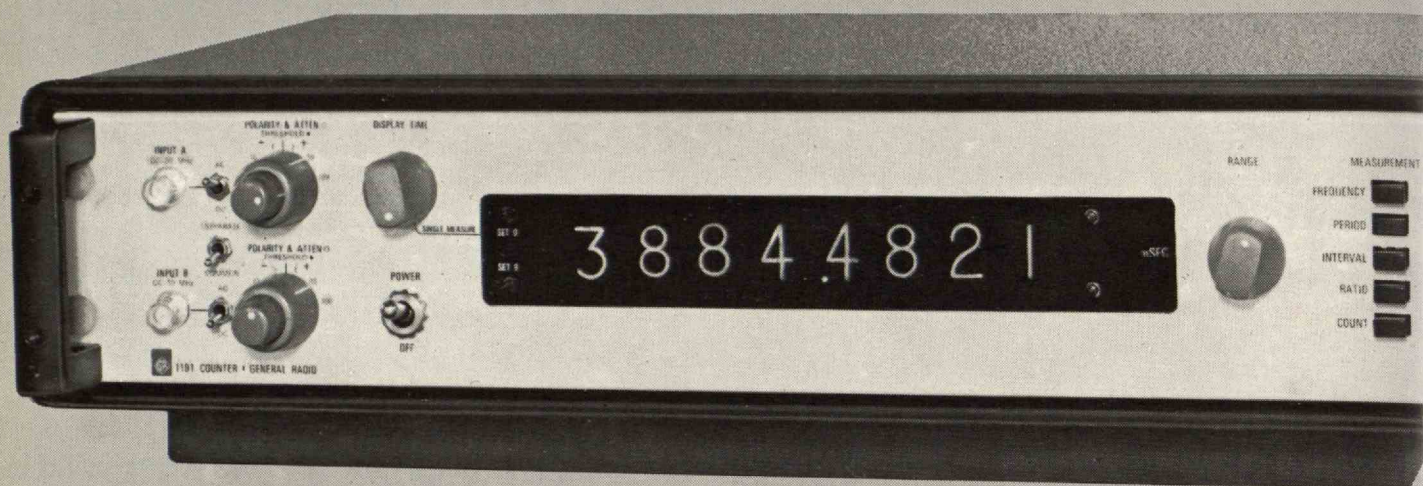
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partment, second floor, main building of the Harvard Square store for best selection of fabrics during this outstanding event.

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THE TECH COOP
IN THE M.I.T. STUDENT CENTER



Everything you want in a counter . . . and for only \$1340

This new 20-MHz, IC counter-timer has just about everything you have been asking for in a general-purpose counter: multiple-measurement capability, remote programmability, eight-digit readout, two input channels, choice of time base, low cost, and available complementary scalars to extend frequency range to 100 MHz and higher.

Measurement Versatility. Frequency: DC to 20 MHz; $1\ \mu\text{s}$ to 10 s counting gate times. Accuracy of ± 1 count \pm time-base accuracy.

Single Period: Up to 10^9 s (over 3 years); clock rate variable from $0.1\ \mu\text{s}$ to 10 s.

Multiple Period: 1 to 10^8 periods; clock rate $0.1\ \mu\text{s}$.

Time Interval: $0.1\ \mu\text{s}$ to 10^9 s (full input-signal processing).

Frequency Ratio: 1 to 10^8 .

Count: Register capacity 10^8 .

Programmability. Measurement functions, ranges, and most of the secondary controls (such as display time and input-trigger level) can be programmed remotely. Most of the programming is controlled by simple contact closures to ground. Models are

available with high-speed, buffered BCD outputs from internal storage to drive auxiliary data-handling equipment.

Readout. Eight digits of high-contrast neon indicators, with automatic display of decimal point and units. Continuous display from storage provides rapidly corrected data without flicker.

Input Circuits. Two high-sensitivity input channels consisting of a high-impedance, low-noise FET circuit preceded by a 3-position step attenuator. Full controls for trigger level, slope, and polarity. The 1-megohm input impedance is constant for all control settings, permitting use of general-purpose, low-capacitance oscilloscope probes.

Time Base. Choice of time base to match needs and budget. Room-temperature oscillator has excellent stability, better than $2 \times 10^{-7}/^\circ\text{C}$ from 0° to 50°C , which is adequate for most applications. A high-precision oscillator, in proportional-control oven, provides a stability of better than $2 \times 10^{-10}/^\circ\text{C}$ from 0° to 50°C when operated continuously. Either time base can be locked to an external standard frequency of 0.1,

1.0, 2.5, 5, or 10 MHz. Because it has no warmup frequency transient, the room-temperature oscillator is specifically recommended for this application.

Cost. Prices* range from \$1340 for the basic counter with a room-temperature crystal to \$1540 for the model with an oven-controlled crystal and BCD outputs. The basic model with only the BCD-output option costs \$1390. For large-volume users, in particular, the savings realized by specifying our new 1191 Counter is substantial.

Higher Frequencies. By using our 1156-D decade scaler with the 1191 Counter, you can extend the upper frequency limit of 1191 to 100 MHz. A new scaler to be available soon will extend the limit to 500 MHz. For complete information, write General Radio Company, W. Concord, Mass. 017 telephone (617) 369-4400; TWX (710) 347-1051.

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*Prices apply only in the U.S.A.